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GENERAL BOARD OF HEALTH.

PAPERS

RELATING TO

THE HISTORY AND PRACTICE

OF

VACCINATION.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
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TO THE RT. HON. THE PRESIDENT OF THE GENERAL BOARD OF HEALTH.

SIR,

YOU have desired me to lay before you, to the best of my judgment, such medical facts and considerations as will assist you in estimating the hygienic value of vaccination, and the strength of any objections which have been alleged against its general adoption.

Accordingly, I have now the honour of bringing to your notice, as an Appendix to this Letter, a mass of material which will, I believe, justify conclusions on the very important subject to which they relate.

Enumeration of appended documents.

That appended material is as follows:—

A. The evidence which, in 1802, was given by Dr. Jenner before a Committee of the House of Commons appointed to consider his claims to a public reward;

B. The Report subsequently made by the said Committee;

C. A Report which, in reference to certain assertions made in disparagement of vaccination, was issued, in 1806, by the medical council of a "Royal Jennerian Society," then existing;

D. A Report on Vaccination which, in 1807, at His Majesty's command, was made by the Royal College of Physicians of London;

E. A paper extracted from the Transactions for 1852 of the Royal Medical and Chirurgical Society of London, and entitled "On the Protection against Small-pox afforded by Vaccination, illustrated by the Returns of the Army, Navy, and Royal Military Asylum," by T. Graham Balfour, M.D., Surgeon to the Royal Military Asylum, Chelsea;

F. A paper extracted from the Transactions for 1853 of the same Society, and entitled "An Analytical Examination of all the Cases admitted, during Sixteen Years, at the Small-pox and Vaccination Hospital, London, with a view to illustrate the Pathology of Small-pox, and the protective influence of Vaccination, in degrees varying according as the Vaccination has been perfectly or imperfectly performed," by J. F. Marson, Esq., Resident Surgeon to the Hospital;

G. The Petition of Mr. Marson to the House of Commons, in 1856;

H. A communication from Dr. Greenhow, Lecturer on Public Health at St. Thomas's Hospital, in reference to the present death-rates of London, at different ages and from different diseases, as compared with the corresponding death-rates at the end of the 17th and in the middle of the 18th century;

J. A long succession of Answers to certain Questions which, with a view to my present object, have been circulated among distinguished members of the medical profession, extensively in the United Kingdom, and partially in France and Germany;

K. Information communicated by the several Governments of France, Austria, Prussia, Sweden and Norway, Denmark, Portugal, Bavaria, Baden, and Wirtemberg, and by certain of our own Public Departments; stating, in reply to similar Questions, what has been the public experience of vaccination in each country addressed.

As prefatory to these documents, I am instructed to submit to you my own reflexions on the subject; and in proceeding to this task, I believe I shall best fulfil your object by discussing, in turn, each of the following questions:—

Heads of proposed inquiry.

(I.) What kind of an evil was small-pox before vaccination arose to resist it?

(II.) What facts and arguments led to the first sanction of vaccination, and to what sort of inquiry were they subjected?

(III.) What further knowledge, at the end of half a century's experience, has been gathered on the protective powers of vaccination?

(IV.) What evils have been shewn to attend its practice, and to counterbalance its alleged advantages?

(V.) How far are there realized, in this country, those benefits which can reasonably be expected from the general use of vaccination?

I.—SMALL-POX BEFORE THE DISCOVERY OF VACCINATION.

You will not, I trust, think it irrelevant that I begin by referring to the history of small-pox. To the civilised classes of society, it has now almost ceased to be a fatal disease; and among them, accordingly, there is a temptation to forget how their fathers and grandfathers regarded it.[*] Hence, in the middle of the 19th century, the very success of vaccination may have blinded people to its importance. It is so easy to be bold against an absent danger—to despise the antidote while one has no painful experience of the bane.

Dangers of natural small-pox.

Yet indeed, apart from historical records, our present daily experience of the nature of the disease might almost enable us to construct a description of the course which it has run. To know of it, that it is *fatal to a very large proportion of those whom it attacks;* that it is *eminently infectious from person to person;* and that it *seizes, with very few exceptions, on all who for the first time come within its range;*—this, if one reflects on it, is almost to have read the story of its ravages.

Different circumstances under which it has prevailed.

Among remote populations.

The details at least may be conjectured. To remote or insular populations, having infrequent and difficult intercourse with the busier masses of mankind, such an infection would come seldom; but, having come, it would find, perhaps, the entire generation prone to receive it. There might have been no previous visitation within living memory. None of the population would have earned exemption by having suffered in a former epidemic. The disease, under such circumstances, must have ravaged more fiercely than the most ruthless of human wars: its effects on mankind must have been comparable to that utter obliteration of vegetable life which ensues when the army of locusts, descending on pastures and vineyards, and sweeping onward with fatal procession, converts into the likeness of a desert what just before was all freshness and fertility.

In every country, probably, its first invasion has been of this kind; and its recurrences, when far apart, have been of equal malignity. Thus it was that in 1518, following European adventure to the Western world, it concurred with fire and sword and famine and blood-hounds to complete the depopulation of St. Domingo;[†] thus, that soon afterwards, in Mexico, it even surpassed the cruelties of conquest, suddenly smiting down 3½ millions of population and leaving none to bury them;* thus, that in Brazil, in the year 1563, it extirpated whole races of men; thus, that about the same period, in the single province of Quito (according to De la Condamine) it destroyed upwards of 100,000 Indians. And thus, too, it has been in later days that Siberia and Kamschatka† have been ravaged; thus, that again and again, till very recent times, the same dreadful pestilence has depopulated Greenland and Iceland.‡ Before the terror of its presence, communities literally dissolved themselves;§ and the well-known description of the plague at Athens does not convey more dreadful images of human suffering than may be gathered from the writings of those travellers ‖ who, even to the latest times, have witnessed the power of natural small-pox against remote unprotected populations.

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[*] There were two words which Prince Kaunitz would not allow to be uttered in his presence: "Death" was one, "Small-pox" was the other.

[†] "Variolarum morbilli eis ignoti hactenus . . . qui tanquam morbosas pecudes contagioso halitu eos invaserunt." (Pet. Mart. Angler. de Orbe Novo, decad. iv. c. 10.)—Not six and twenty years had passed since the island (then

In civilised countries.

While such was small-pox in the less travelled parts of the world, it seems certain that in civilized Europe, with its constant intercourse of towns and countries, the disease was at least

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containing a million of Indians) had been discovered by Columbus, who received from the inhabitants an amount of kindness and hospitality which touched him to the heart, and whose language, in describing them, gives singular pathos to the thought of their then impending misery and extinction.—Comp. Helps's "Spanish Conquest in America," I. 124.

* "*No habia quien los enterrasse*" are words which Mr. Prescott quotes from Sahagun's History. Mr. P. also ("Conquest of Mexico," v. 6) describes this terrible epidemic as "sweeping over the land like fire over the prairies, smiting down prince and peasant, . . . leaving its path strewn with the dead bodies of the natives, who (in the strong language of a contemporary) perished in heaps like cattle stricken with the murrain." Dr. Stricker (Oppenheim's Zeitschr., vol. xxxiv.) gives information about several later epidemics in Mexico. He states that in 1779 its ravages were dreadful; that it then occasioned in the capital alone nearly 9,000 deaths out of nearly 39,000 attacks; and that in 1797 again it caused in the city 4,451 deaths out of 24,516 attacks. With these records he contrasts what has happened since the introduction of vaccination; that in 1829–30, when small-pox was most severely epidemic, vaccination was almost always protective; and that in 1830–1 there died in New Leon 1,740 persons, without a single vaccinated person contracting the infection.

† Pallas (Reisen, St. Petersb., 1770) makes mention more than once of the small-pox in Siberia; and in reference especially to the Ostjaks (Vol. iii. p. 50) describes it as the chief obstacle to an increase of their population.

Captain Cook (Voyage to the Pacific Ocean, Lond. 1785, p. 365) speaks of the small-pox at its first appearance (1767) in Kamschatka as "marking its progress with ravages not less dreadful than the plague, and seeming to threaten "their entire extirpation."

‡ A subjoined official communication from Denmark (App. p. 173) gives interesting particulars of various visitations which have befallen Iceland and Greenland. As late as 1734, Greenland suffered its first epidemic of small-pox, when nearly two thirds of the inhabitants were swept away. In Iceland the disease had been known from much earlier times; but, in its eighteenth visitation (1707) it is said to have destroyed 18,000 persons out of a population of about 50,000. In Crantz's History of Greenland (London, 1767, i. 335–7) may be read terrible details of the epidemic just adverted to: "Empty depopulated houses and unburied corpses, some within and some without the houses," are described; and "in one island they found only one girl with the small-pox upon her, and her three little brothers; "the father, having first buried all the people in the place, had laid himself and his smallest sick child in a grave "raised with stone, and ordered the girl to cover him." Sir George Mackenzie (Travels in Iceland, Edin. 1811, p. 409) referring to small-pox in Iceland, says, "its ravages have been such as to render this disease important even in the political history of the island."

§ It is said (Ring, Treatise on Cowpox, p. 994) that after such a dispersion the capital of Tibet once remained for three years without inhabitants. The same author (p. 604) describes that about the end of last century a tribe of Esquimaux on the Labrador coast was put to flight by the outbreaking of small-pox, and did not venture to return for three years; when their country had "become a desert without a living soul in it, but they found the skeletons of "500 persons who had fallen victims to that horrible disease." Incidents of this kind may be found abundantly mentioned by travellers to whom I have referred, and Dr. Mead (Works, p. 311) describes the Hottentots on a particular occasion as drawing lines of defence against any communication with the sick, and shooting all who attempted to pass.

‖ Striking accounts of its ravages among the North American Indians, in very recent times, may be gathered from Catlin's "Letters and Notes on the Manners, Customs, and Condition of the North American Indians" (Lond. 1841) as especially at vol. i. pp. 6, 80, 99, 213; vol. ii. pp. 24–5, 43–4, 161, 238, 255; and App. A. At the first-mentioned of these passages, Mr. Catlin observes "Thirty millions of white men are now scuffling for the goods and luxuries of life as deadly. Its strength, indeed, was differently distributed. Not—as in Greenland—twice or thrice in a century, but incessantly, that fatal sickle was in motion, and the harvest counted

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" over the bones and ashes of twelve millions of red men, six millions of whom have fallen victims to the small-pox, and " the remainder to the sword, the bayonet, or whiskey." And in another place (ii. 257) he adds "I would venture " the assertion, from books that I have searched and from other evidence, that of the numerous tribes which have already " disappeared, and of those that have been traded with, quite to the Rocky Mountains, each one has had this exotic " disease in their turn, and in a few months have lost one half or more of their numbers." Washington Irving's " Astoria " also makes mention of recent dreadful outbreaks, in which "almost entire tribes" have been destroyed. It may not be superfluous to quote from a third source some details which both confirm and illustrate the above. Mr. Lloyd, the translator of Prince Maximilian's Travels in the interior of North America, quotes in the preface to his work the following description of an epidemic of small-pox which befel the Indians twenty years ago, adding that the general correctness of the details had been confirmed to him by several travellers who had subsequently visited those nations:—"The disease first broke out about the 15th of June, 1837, in the village of " Mandans, a few miles below the American fort Leavenworth, from which it spread in all directions with unexampled " fury. The character of the disease was as appalling as the rapidity of the propagation. Among the remotest " tribes of the Assiniboins from 50 to 100 died daily. The patient, when first seized, complains of dreadful pains " in the head and back, and in a few hours he is dead; the body immediately turns black, and swells to thrice its " natural size. In vain were hospitals fitted up in Fort Union, and the whole stock of medicines exhausted. For " many weeks together our workmen did nothing but collect the dead bodies and bury them in large pits; but since " the ground is frozen we are obliged to throw them into the river. The ravages of the disorder were the most " frightful among the Mandans, where it first broke out. That once powerful tribe which, by accumulated disasters, " had already been reduced to 1,500 souls, was exterminated, with the exception of thirty persons. Their neighbours, " the Big-bellied Indians and the Ricarees, were out on a hunting excursion at the time of the breaking out of the " disorder, so that it did not reach them till a month later; yet half the tribe was already destroyed on the " 1st of October and the disease continued to spread. Very few of those who were attacked recovered their health; " but when they saw all their relations buried, and the pestilence still raging with unabated fury among the remainder " of their countrymen, life became a burden to them, and they put an end to their wretched existence, either with " their knives and muskets, or by precipitating themselves from the summit of the rock near their settlement. The " prairie all around is a vast field of death, covered with unburied corpses, and spreading for miles pestilence and " infection. The Big-bellied Indians and the Ricarees, lately amounting to 4,000 souls, were reduced to less than the " half. The Assiniboins, 9,000 in number, roaming over a hunting territory to the north of the Missouri as far as " the trading posts of the Hudson's Bay Company, are, in the literal sense of the expression, nearly exterminated. They, " as well as the Crows and Blackfeet, endeavoured to fly in all directions, but the disease everywhere pursued them. " At last every feeling of mutual compassion and tenderness seems to have disappeared. Every one avoided the others. " Women and children wandered about the prairie seeking for a scanty subsistence. The accounts of the situation " of the Blackfeet are awful. The inmates of above 1,000 of their tents are already swept away. They are the " bravest and most crafty of all the Indians, dangerous and implacable to their enemies, but faithful and kind to their " friends. But very lately we apprehended that a terrible war with them was at hand, and that they would unite " the whole of their remaining strength against the whites. Every day brought accounts of new armaments, and of a " loudly expressed spirit of vengeance towards the whites, but the small-pox cast them down, the brave as well " as the feeble, and those who were once seized by this infection never recovered. It is affirmed that several bands " of warriors who were on their march to attack the fort, all perished by the way, so that not one survived to convey " the intelligence to their tribe. Thus, in the course of a few weeks, their strength and their courage were broken, " and nothing was to be heard but the frightful wailings of death in their camp. Every thought of war was dispelled, " and the few that are left are as humble as famished dogs. No language can picture the scene of desolation which " the country presents. In whatever direction we go, we see nothing but melancholy wrecks of human life. The " tents are still standing on every hill, but no rising smoke announces the presence of human beings, and no sounds " but the croaking of the raven and the howling of the wolf interrupt the fearful silence. The above accounts do not " complete the terrible intelligence we receive. There is scarcely a doubt that the pestilence will spread to the " tribes in and beyond the Rocky Mountains, as well as to the Indians in the direction of Santa Fé and Mexico. It " seems to be irrevocably written in the book of fate, that the race of red men shall be wholly extirpated in the land " in which they ruled the undisputed masters till the rapacity of the whites brought to their shores the murderous " fire-arms, the enervating ardent spirits, and the all-destructive pestilence of the small-pox. According to the " most recent accounts, the number of Indians who have been swept away by the small-pox, on the western frontier of " the United States, amounts to more than 60,000."

from day to day. Instead of coming after long absence on masses of population entirely unprotected against the infection, it recurred in each place so frequently that, for the most part, at any given moment, a more or less considerable majority of the inhabitants would have faced the danger before. They would have obtained against its attacks that protective exemption which was generally the good fortune of survivors. But it is a moderate computation, that for every five persons thus, at the price of much past suffering, almost secured against the disease, one at least must have died. The annual ravages of small-pox in Europe[*] alone, have been estimated at half a million of lives. M. De la Condamine[†] reckoned that in France a tenth of the deaths were by small-pox; Rosen's estimate of Sweden was to the same effect. For our English experience, there exist only imperfect records; but it seems that, within the London Bills of Mortality, small-pox, when not at its worst, averaged a fourteenth[‡] of the annual total of deaths; a fourteenth, too, at times when that total, as compared with the population, represented perhaps double our present death-rate.

Illustrated in royal families.

For a popular notion of the disease, it may be enough to cite what it did in royal families.[§] In the circle of William the Third, for instance: his father and mother died of it, and, not least, his wife; and his uncle, the Duke of Gloucester; and his cousins, the eldest son and the youngest daughter of James the Second; and he himself (like his friend Bentinck) had suffered from it most severely, barely surviving, with a constitution damaged for life.[‖] Or again, in the Court of Austria: "Joseph the First (says Vehse) was carried off, when not "more than thirty-three years of age, by the small-pox; to which in the course of the "eighteenth century, besides him, two empresses, six archdukes and archduchesses, an elector "of Saxony, and the last Elector of Bavaria, fell victims." To this list might have been added, no doubt, many other names; among them, for instance, a dauphin (1711) and a king (1774) of France, a queen (1741) of Sweden, and an emperor (1727) of Russia.

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[*] Dimsdale, who went to St. Petersburg to inoculate the Empress Catherine, talks (Tracts, St. Petersb. p. 119) loosely, and probably with exaggeration, of *two millions* as the annual mortality of the Russian empire from small-pox; and he mentions that on one occasion, going in search of virus to a village where small-pox had been prevailing, he found that of 37 patients all but 2 had died. Clarke (Travels) speaks of the small-pox mortality of China as "incalculable." Maitland, the first English inoculator, says of natural small-pox in the Levant that in some years it is "a kind of plague that sweeps away at least a third of those who are seized with it." And Holwell (Account of Manner of Inoculating for the Small-pox in the East Indies, London, 1767, p. 4) gave the following description of its ravages in Bengal:—"Every seventh year, with scarcely any exception, the small-pox rages epidemically in these "provinces during the months of March, April, and May, and sometimes until the annual returning rains about the "middle of June put a stop to its fury. On these periodical returns (to four of which I have been a witness) the "disease proves universally of the most malignant confluent kind, from which few, either of the natives or Europeans, "escaped that took the distemper in the natural way, commonly dying on the first, second, or third day of the "eruption. . . . The usual resource of the Europeans is to fly from the settlements and retire into the country "before the return of the small-pox season."

[†] Mémoire sur l'Inoculation de la Petite Vérole, 1754; or English edition (with additions from the author) by Dr. Maty, 1755. De la Condamine estimated that small-pox "destroys, maims, or disfigures the fourth part of mankind." Williams (Elements of Medicine, I., p. 202) quotes the French Minister of the Interior as estimating (Report on Vacc. 1811) the former annual mortality by small-pox to have been 150,000 persons. Others (comp. Ring op. cit. 700) state it at a very much smaller though still enormous amount.

[‡] See Dr. Jurin's "Letter containing a Comparison between the Mortality of the natural Small-pox and that given by Inoculation," Lond. 1723. His estimate is formed on the Bills of Mortality of the forty-two years 1667–86 and 1701–22; the intermediate years 1687–1700 being left out because in them measles and small-pox were not distinguished.

[§] Extensive fatality of any particular disease in single families can of course rarely be known, except where the house is of historical importance; but the same sort of thing must have been frequent in all classes of society. In one of Horace Walpole's letters (April 2, 1750) we read—"Lord Dalkeith is dead of the small-pox in three days. It is "so dreadfully fatal in his family, that, besides several uncles and aunts, his eldest boy died of it last year; and his "only brother, who was ill but two days, putrefied so fast that his limbs fell off as they lifted the body into the coffin."

[‖] Burnet (Hist. William and Mary, p. 304) says of him:—"He was always asthmatical, and the dregs of the small-pox falling on his lungs, he had a constant deep cough."

It would be thought an awful epidemic now-a-days, that should strike like this in high places.

Mutilations and consequent ill-health of many who were not killed.

Yet the ravages of small-pox are not half enumerated in the list of the myriads whom it killed. From the earliest to the latest medical records of the disease, there is constant mention of the tax which it levied upon survivors.* Among those who outlive it (says De la Condamine) many either totally or partly lose their sight or hearing; many are left consumptive, weakly, sickly, or maimed; many are disfigured for life by horrid scars, and become shocking objects to those who approach them. Another learned writer of the same period, after describing these frequent sequels of the disease, says that its very nature is one *quæ nullâ furcâ sese expelli patitur, sed usque recurrit.*† Sir Gilbert Blane‡ at a later period quoted a Report of the Hospital for the Indigent Blind, to the effect that two thirds of those who applied there for relief had lost their sight by small-pox.

Worst of all were these ill effects in persons already of feeble, especially of scrofulous, constitutions. Nothing (says Dr. Gregory) developes that tendency more certainly than protracted small-pox.§

Habitual fears of the disease.

It is scarcely needful to say, of the disease I have described, that it was among all civilized nations a constant source of terror. Each time that the contagion was re-introduced to a place, all who had not been touched in previous visitations (including especially such children as had been born in the interval) might expect to become subjects of attack. Accident in individual cases might delay this dangerous moment, but for nearly all it was only delay.‖ Of persons not prematurely cut off by other diseases, in the long run very few escaped this infection.[*] Seventy years of age were no security; and for such as were disposed to triumph at the end of an epidemic which had spared them, there was often quoted the old saw, *Nemo ante obitum beatus*. Thus, at every rumour of the disease, men might tremble for the valuable lives of others[†] or for their own; and that horror of the living patient, which so loathsome an infliction occasioned, became, when death had ended his sufferings, a very panic towards his corpse.[‡]

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* De la Condamine, op. cit. p. 57. "As sequelæ of small-pox Dr. Willan enumerates glandular swellings, ulcers "(often gangrenous) about the thighs, scrotum, and knees, puffy tumours of the soft parts, enlargement of the bones, "anchyloses of the joints, ophthalmia, deafness, cough, dyspnœa, diarrhœa, anasarca, hydrothorax."—Williams, loc. cit.

† Tralles, de Insitione Variolarum, 1765, p. 159, who begins his account by saying :—"Ab illo ævo quo innotuêre "variolæ ad hunc diem myriades exemplorum prostitêre, tristium vestigiorum que in corpore humano omnibusque ejus "partibus illæ post se reliquerunt."

‡ Medico-Chirurg. Transact., vol. x., p. 326. Dr. Gregory also writes, that a large proportion of the blind have been found to owe their misfortune to the secondary fever of small-pox.

§ "Accordingly, in scrofulous constitutions we see secondary fever complicated with strumous ophthalmia, "characterized . . . . by obstinate resistance to every kind of remedial treatment. Irritable ulcers form under the lower "eyelid, and around the knee, ankle, and elbow joints, and are found very difficult to heal. Glandular enlargements of "the neck take place which sometimes suppurate, but oftener continue indolent and of stony hardness. Children "frequently suffer from otitis." Gregory, op. cit. p. 741.—"On parle de quelques individus scrofuleux dont l'état s'est "amélioré sensiblement à la suite de la variole; mais nous avons rarement eu l'occasion de vérifier ce fait à l'Hôpital "des Enfans. Une circonstance qui nous a, au contraire, frappée, c'est que les affections scrofuleuses graves "et la phthisie pulmonaire reçoivent ordinairement de la variole une impression défavorable : presque toujours "alors leur marche est accélerée, et leur terminaison funeste suit de près."—Guersant et Blache, Dict. de Méd., art. *Variole.* See also to the same effect, Rayer, Maladies de la Peau, tome i., p. 522; and Lugol, sur les Causes des Maladies Scrofuleuses, p. 220. It deserves notice that Jenner, in his first publications, laid great stress on these, then notorious, after-effects of small-pox.

‖ Mr. Cross, in his account of the variolous epidemic in Norwich (p. 15), says—"In several instances I have met "with severe small-pox in adults who had at various times, both in Norwich and in London, resisted the intimate "and continued exposure to the contagion of that disease, and who supposed, with some appearance of reason, that "they should for ever be free from it." And he subjoins the following anecdote, derived from one of the Suttons, who are mentioned in it :—"A man who believed himself to have had the small-pox lived for *twelve years* as nurse in the "establishment for the reception of inoculated patients which the Suttons had near Norwich, continually waiting upon "the patients who were undergoing the disease; and at the end of that time he caught the small-pox, of which "he died."

Commencement of 18th century.

Perhaps at no previous moment of English history had the horror of small-pox been greater or more fully justified than at the beginning of the last century.

Inoculation of small-pox.

And now for the first time there came to us a story that we could, so to speak, make terms with this loathsome and murderous enemy; that, by receiving it of our own accord, we could disarm it; that we could (as it was expressed) "buy the small-pox" cheap; that the susceptibility to contract its fatal infection could be exhausted by artificial means, giving, indeed, the disease, but giving it so mildly, that life was almost unendangered in the process.

This, indeed, was substantially the fact; and to the present time it remains one of the most interesting and least explained facts in pathology, that the specific contagion or ferment of small-pox, so uncontrollable in its operations, when it enters a man in the ordinary way of his breathing an infected atmosphere, becomes for the most part disarmed of its virulence, when it is artificially introduced to the system through a puncture of the skin; so that a person exposed to this artificial infection very generally contracts the disease in its mildest and most tractable form.[§]

Introduction of the practice in England.

This practice, subsequently known in England as inoculation for the small-pox, seems to have been followed for ages in the East. Not only, it is said, had the Chinese since the sixth century been accustomed to procure, by special means of their own, an artificial infection of the disease; but the Brahmins from remote antiquity had practised the very operation which was now to be discussed in England. In Persia, Armenia, and Georgia, it is stated also to have been in vogue, and to have spread as a popular custom, not only about the shores of the Mediterranean, but even to those of the Baltic, to Scotland, and still less accountably to Wales. It was not thus, however, that the discovery first became notorious in England, but in the years 1714-16 communications on the subject were published in London by members of the medical profession who had witnessed in Constantinople and Smyrna the great success of the practice; and in 1717 Lady Mary Wortley Montague's well-known letter (xxxi.) from Adrianople effectually awakened the public curiosity. Yet by her example, even more convincingly than by her pen, did Lady Mary introduce the knowledge of inoculation; for while still resident in Turkey she shewed her faith in it by submitting her son to the operation; and four years afterwards, having meanwhile returned to London, she had the first demonstration of the Eastern practice made here, almost publicly, on her daughter. The result being most satisfactory, others were soon encouraged to repeat the experiment; and in 1722 (after a preliminary experiment on seven condemned criminals) the critical course was taken of inoculating two children of the royal family.

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[*] "All mankind, with few exceptions, are susceptible of the variolous poison at some period of their lives . . . . . "A few persons pass through a long life apparently insensible to or insusceptible of the small-pox virus. It is a "curious and important circumstance, that, so far as is yet known, such constitutions exhibit a like inaptitude to "receive and nourish the vaccine disease."—Gregory, in Cyclop. Pract. Medicine, iii. 744.

[†] E. g. "The small-pox raged this winter (1694–5) about London, some thousands dying of them, which gave us "great apprehension with regard to the Queen, *for she had never had them*. In conclusion she was taken ill . . . . ."—Burnet's Hist. William and Mary, p. 136.

[‡] Witness Saint Simon's account of the Grand Dauphin's death:—"La Vallière fut le seul des courtisans qui, ne "l'ayant point abandonné pendant sa vie, ne l'abandonna point après sa mort. Il eut peine à trouver quelqu'un pour "aller chercher des Capucins pour venir prier Dieu auprès du corps." Or Besenval's description how, on a different occasion, when Louis XV. had been huddled into his coffin, "quelques prêtres, dans la chapelle ardente, furent les "seules victimes condamnées à ne pas abandonner les restes d'un roi qui . . . . &c."

[§] Moore's Hist. of Small-pox, p. 218 et seq.; also communications by Timoni and Pylarini in the Philosoph. Transactions, Nos. 339 and 347; also Kennedy's Essay on External Remedies, 1715; and Maitland's Account of Inoculating the Small-pox, 1722. In Kennedy's work, p. 157, mention is made of "some parts of the Highlands of Scotland, where they infect their children by rubbing them with a kindly pock, as they term it;" and the attractive estimate given of such inoculated small-pox is, that "it need be no more minded than as in giving or taking the itch."

From this time the inoculation of small-pox possessed a recognized though not an uncontested place in medical practice.

Objections raised against its use.

Not uncontested, for innumerable absurd objections were raised, which much interfered with its general adoption. It was said to be wicked and irreligious, and to savour strongly of magic, to promote vice and immorality, and to be an inspiration of the devil.* It was said to instil a vicious humor without establishing an issue for its discharge; still worse, to be the means of introducing syphilitic and other infections into the body, and of exciting scrofula and consumption. Inoculating surgeons (it was urged) ought to be cut off, as poisoners, from the professional community.

Besides all this nonsense, there were objections, exaggerated but not unfounded, against a practice which sometimes occasioned death to the subject of the operation. It could not be denied that the worst possible forms of small-pox did sometimes, though rarely, ensue on this proceeding. Thus, in the first eight years there were inoculated in England only 845 persons, of whom seventeen had died; and in Boston, United States, there had been an equal amount of failure among the earlier experiments. It might not unreasonably be urged that this was a large risk to incur in the pursuit of a somewhat uncertain good; for, said the objectors, there is no absolute security given by it against subsequent attacks of small-pox.† But as improvements were progressively made in the methods of managing inoculated persons, the dangers from the operation greatly diminished; and Mr. Moore probably overestimates the deaths which would follow the operation under the most favourable circumstances when he says, that "after the last improvement in treatment had been established, probably not more than one in two hundred were lost."‡

Its advantages.

The advantages of this alternative, as compared with that of encountering the risks of natural small-pox, were well set before the public by Dr. Jurin and Dr. Mead in England, by M. De la Condamine in France, and by others. The superstitions and prejudices respecting the practice were contended against by many able impartial persons. In 1746 an hospital was established for inoculating the poor, and for receiving them when affected with small-pox; and in 1754 the Royal College of Physicians of London pronounced its authoritative sanction of what was now no longer a speculative novelty.*

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* See Massey's Sermon against the dangerous and sinful Practice of Inoculation, Lond. 1722, where, *inter alia*, it is written—"Let the atheist and the scoffer, the heathen and the unbeliever . . . inoculate and be inoculated." This author regards natural small-pox as an useful check on "the encrease of vice and immorality," and thinks men have good reason to be grateful for it as among "the wholesome severities ordained for offenders." Among the numerous objections subsequently raised against inoculation in France, especially by Monsieur Hecquet, it was urged that it came from Turkey, and had been well received in a Protestant country.

† It is remarkable that, at the moment of introducing inoculation to England, this objection was mentioned as one which had currency in the East. Kennedy (op. cit. p. 155) says—"The greatest objection commonly proposed is, "whether or not it hinders the patient from being infected a second time." He adds, that in such cases of re-infection the second attack is "rarely or never in the same manner, or the same fulness of malignity . . . it generally proves to "to be that commonly called the bastard or hog-pox, which is empty or skinny, and very little matter or malignity "contained in it."

‡ History of Small-pox, p. 302. De la Condamine says (p. 20) that "out of 6,398 persons inoculated in England, but 17 are suspected to have died of the consequences of the operation, which is only one in 376." Dr. Maty, the learned friend and translator of Condamine, remarks on this passage: "I can't help thinking M. la Condamine's "proportion full large, and I am inclined, after a mature examination of all the facts that are come to my knowledge, "to reduce it to that of one in a hundred." Among 5,964 individuals inoculated at the Small-pox Hospital in the years 1797–9, there were only nine deaths (Watson ii., 733). Gregory, loc. cit., p. 749, says: "the average number of "deaths at the Inoculation Hospital was only three in a thousand." The National Vaccine Board (see Reports 1825 and 1837) speaks decidedly of "one in 300" as the proportion of the inoculated that "will surely die" from the operation.

Its disadvantages.

Many difficulties remained. "Inoculation," says Mr. Moore, "had become a very serious
" affair; for the preparatory treatment lasted commonly a month, and medical attendance was
" requisite for five or six weeks longer; and, though occasional disasters were palliated, they
" could not be wholly concealed. Families in moderate circumstances and timid mothers were
" not therefore very easily induced to incur the expense and risk of such a process. Consequently, the practice of inoculation, though widely diffused, was in a great measure confined
" to the opulent..... It appeared from a calculation made by Professor Monro in 1765, that
" between five and six thousand persons had been inoculated in the whole of Scotland in
" thirty-one years, ... and the fatal cases amounted to one in seventy-eight. Nothing, therefore, could be more vain than the expectations of those who imagined that such a system
" could be universally adopted."

Yet, subsequently, as improvements were made, under which its adoption implied far less cost of time, convenience, money, and life; and as the public became aware of these improvements, great impulse was given to the progress of inoculation; and this progress, as regards the masses of society, was made at least more rapid, if not more sure, by the competition of quacks, who promised for it a hundredfold what it could perform.

Its tendency to diffuse the infection of small-pox, and to cause an increased mortality.

But now at length it was that people began to see, in its full force, the one real and almost insuperable objection to variolous inoculation. For the inoculated themselves it was indeed an immense gain. By passing through the artificial disorder, they apparently became as safe against any recurrence of the infection as if they had suffered from it in the natural way; and they attained this result at a fiftieth part of the risk which would have attended the natural disease. They had no reason to complain.

But, meanwhile, what was the state of the remaining millions of the population of England? A principal point of improvement in the treatment of the inoculated was, wherever their strength allowed, to send them abroad into the open air; and as small-pox in its inoculated variety was not less infectious than in its natural form, the result may be imagined. Especially in the metropolis it could be observed; for here, under the influence of those doctrines which (so far as concerned the primary patients alone) made the chief improvements in treatment, inoculated persons were allowed to become incessant sources of general contagion. Even the Governors of the Small-pox Hospital (says Mr. Moore) broke through their original prudent regulations;† whoever applied at their gates were inoculated, and suffered to wander through the city of London covered with pustules and exhaling infectious vapour. The consequences of this system were, at the end of the century, admirably reviewed by Dr. Heberden, in a section of his well-known work‡; and as this book is one of simple medical research, written with no controversial object, it will be well to consider his estimate of the case.

Dr. Heberden's estimate of thi evil.

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* "Argumenta quæ contra hanc variolas inserendi consuetudinem in principio afferebantur, experientiam repellisse ...... eamque humano generi valde salutarem esse se existimare."—Taylor, Orat. Harv., 1855.

† The Small-pox Hospital (says Dr. Williams, p. 199) was much too small to effect its object, since it could only receive fifteen persons at a time.

‡ On the Increase and Decrease of different Diseases, and particularly of the Plague. By Wm. Heberden, junr. 1801.

"The inoculation of the small-pox having been first used in England since the beginning "of the eighteenth century, and having been now for many years generally adopted by all "the middle and higher orders of society, it becomes an interesting inquiry to observe, from "a review of the last hundred years, what have been the effects of so great an innovation "upon the mortality occasioned by that disease. But however beneficial inoculation prove "to individuals, or indeed to the nation at large, the Bills of Mortality incontestably shew, "that in London more persons have died of the small-pox since the introduction of that practice. "The poor, who have little care of preserving their lives beyond the getting their daily "bread, make a very large part of mankind. Their prejudices are strong, and not easily "overcome by reason. Hence, while the inoculation of the wealthy keeps up a perpetual "source of infection, many others, who either cannot afford or do not choose to adopt the same "method, are continually exposed to the distemper. And the danger is still increased by "the inconsiderate manner in which it has lately been the custom to send into the open "air persons in every stage of the disease, without any regard to the safety of their "neighbours. It is by these means that, while inoculation may justly be esteemed one of "the greatest improvements ever introduced into the medical art, it occasions many to fall a "sacrifice to what has obtained the distinction of the *natural* disease. This must always be "an objection against making any great city the place for inoculation, until the practice is "become universal amongst all ranks of people. Out of every thousand deaths in the Bills "of Mortality, the number attributed to the small-pox during the first thirty years of the "eighteenth century, before inoculation could yet have had any effect upon them, amounted "to seventy-four. During an equal number of years at the end of the century, they "amounted to ninety-five. So that, as far as we are enabled to judge from hence, they "would appear to have increased in a proportion of above five to four."

This objection almost insuperable.

Of the objections thus suggested to variolous inoculation—of the objections to it, at least, as a system for general adoption—I have ventured to say that they were almost insuperable. In theory, at first sight, it might seem otherwise. *If* all persons would but adopt that method, no one could suffer from another; the inoculated might then wander freely in fields and streets, or sit in theatres and omnibuses, finding no un-inoculated whom they could poison. But that *if* covers unattainable contingencies.

Putting aside for the moment all question of the strong and stupid prejudices against inoculation which still operated on multitudes of people; putting aside, also, the immoveable apathy and indifference of still larger numbers whom nothing will ever incite to precautions which look three days forward; putting aside, further, the reasonable fears entertained of an expedient under which two, or three, or four, or five, or ten in every thousand subjects were sure to die; and starting with an imaginary population neither prejudiced, nor apathetic, nor timorous, the inoculators themselves demurred against universal inoculation.* There were conditions of age and conditions of health, under which, even by them, it was thought unsafe to operate. Thus, even assuming an unanimous willingness of the world to adopt inoculation, there must inevitably remain against it this twofold objection:—(1) that it would directly destroy a certain, though small, proportion of those submitted to its performance; and (2) that to the very considerable number of persons, temporarily or permanently ineligible for the operation, it would occasion a greatly increased danger of contracting the natural disease.

State of the case sixty years ago.

And in practice (as may be inferred from Dr. Heberden's remarks) this objection was more fatal than in theory. Inoculation, despite its advantages to individual life, was becoming a serious evil to society. An admirable, and till then unrivalled invention; it could only be worked at an intolerable cost of life.*

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* See Dimsdale's Present Method of Inoculating for the Small-pox, 1779, pp. 9, 12, 13, 21; also De la Condamine, op. cit. pp. 17, 18, 43; also Mead, who implies the same sort of thing when he argues (op. cit. p. 344) that "the venom is communicated to a young, healthy, and, for the age, strong body."

Mr. Moore's estimate of the success of medicine against small-pox down to the end of the 18th century.

The historian of small-pox, looking back from this point of view on the labours which during twelve centuries had been made to mitigate its ravages, comes to a mournful conclusion on their value:—"The confession that must be made is mortifying to a professional man, "for, according to such records as we possess, it appears that in spite of all medical exertion, "the mortality of small-pox had progressively augmented. It has been made evident by "calculations from the Bills of Mortality of the City of London, renowned for medical science, "that at the beginning of the eighteenth century about one fourteenth of the inhabitants died "of the small-pox, and during the last thirty years of that century, when the practice in "small-pox was highly improved, the mortality by this disease had augmented to one tenth. ". . . But this immense and increasing consumption of human lives was not the sole "evil produced by this distemper; for a considerable portion of the survivors were pitted and "disfigured; some lost one of their eyes, a few became totally blind, and others had their "constitution impaired, and predisposed to a variety of complaints, which were productive of "future distress, and sometimes of death. These additional calamities cannot be reduced to "calculation; but as the mortality from small-pox was continually on the increase, these "concomitant evils must have been so likewise."†

Against the substantial justice of this painful criticism, so far as I am aware, no objection can be raised. Medicine baffled and helpless! For after times—for millions of our race—the continued raging of that pitiless plague! A drearier picture could scarcely have saddened mankind.

That this despair was not lasting is due to the genius of an English surgeon; and the close of the eighteenth century, which had much to darken it, will be remembered till the end of human history for the greatest physical good ever yet given by science to the world.

II.—The Early History of Vaccination.

Popular tradition on the efficacy of accidental cow-pox.

Among the dairy-folks of Gloucestershire there was a curious tradition, that a certain pustular eruption occasionally observed on the teats of cows, and supposed to be engendered in them by contagion from the grease of horses, might extend its infection to the human subject; and that persons who had suffered from this *cow-pox*, as it was called, were by it rendered insusceptible of small-pox.

Jenner.

Words to this effect were once spoken in the hearing of Edward Jenner, then a village doctor's apprentice in the neighbourhood of Bristol. They were never afterwards absent from his mind. Thirty years elapsed before their fruit was borne to the public; but incessantly he thought, and watched, and experimented on the subject; and the work in which at length he recorded the incomparable results of his labour may well have commanded the confidence of reflecting persons.

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* From the commencement of inoculation this objection had been made to it on theoretical grounds, but had confused itself with the less reasonable arguments of that period. In France its validity had been recognised; and after a severe epidemic small-pox, which prevailed in Paris in 1763, and was ascribed to an increased infection from the practice of inoculation, this practice was prohibited in the capital, so that (says Mr. Moore) "those who wished "to be inoculated were under the necessity of retiring to the country, where they might reap the advantage of this "operation, without destroying their neighbours." See also De la Condamine, op. cit.

† Moore's History of Small-pox, p. 299.

His first publication.

Little would ever be heard of objections to vaccination, if all who undertake the responsibility of its performance, and all who feel disposed to resist its adoption, would but thoroughly study that masterpiece of medical induction, and imitate the patience and caution and modesty with which Jenner laid the foundations of every statement he advanced.

The protective influence of cow-pox established;

and its inoculability from the cow.

In the first *Inquiry into the Causes and Effects of the Variolæ Vaccinæ* (1798), Jenner set on a scientific basis the popular belief to which I have referred. He citéd in detail many instances of persons who, having at earlier periods of life accidentally contracted an infection from cows or horses, had afterwards shown themselves insusceptible of human small-pox;—instances, where the protective contagion had reached the hands of milkwomen, stable-boys, and the like; where, for twenty, thirty, even fifty years afterwards, its consequences had survived; where the system, even at these distances of time, remained absolutely proof against all attempts to infect it with small-pox, either by inoculation or by the breathing of an infected atmosphere. He further showed by experiment (Case 19) that persons desirous of acquiring this protective influence needed not wait for some accidental infection; they could imitate the manœuvre of small-pox inoculation, and, on any occasion when the cattle of the neighbourhood might be suffering, could let the vaccine infection be surgically transferred to themselves from the cow.

Necessity for this demonstration.

If this had been the limit of Jenner's discovery he would, indeed, have made an interesting contribution to pathological science. For the popular belief which first excited his mind was by no means generally or firmly established, even in the counties where it originated. There were plenty of alleged instances, where cow-pox had failed to afford the imputed protection. The subject was obscured by many sources of fallacy; and nothing less than elaborate and skilful inquiry could have effected the important demonstration.

Partial anticipations of Jenner's practice.

Up to this limit, however, his merits — though very great and original — were not exclusive. No one else, indeed, had come to the subject with the insight of genius; no one else had surmised what immense human interests were involved in that gossip of cowhouses; no one else had seen through the fallacies which made it contradictory and incredible. Still the tradition which had so moved him was not special to his one neighbourhood. Common (as afterwards appeared) to sundry cow-keeping districts, it had floated past many other ears than Jenner's, and as early as 1769 had been paragraphed in a Göttingen newspaper. In parts of Holstein, too, the protective influence of cow-pox had been so thoroughly recognised that, on more than one occasion, its infection had been artificially conveyed to the human subject; and especially Plett, a village schoolmaster, near Kiel, had thus in 1791, inoculated from the cow three children who, three years afterwards, when small-pox prevailed severely in their family, were found to be proof against infection.*

Propagability of cow-pox from person to person.

But this was not the limit of Jenner's achievement. Happily for mankind, his thoughts had from the first stretched further forward in the subject; and it was his transcendent merit to show how that apparently local privilege of the Gloucestershire cowherds might be diffused for the blessing of nations.

For when (in March, 1780) he first disclosed to an intimate friend the magnitude of what was in his mind, and communicated the theory he had formed on the protective influence of vaccine lymph, he "declared his full and perfect confidence that it might be continued in perpetuity by inoculation from one human being to another in the same way that the small-pox was."

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* I borrow this statement from an interesting Lecture by Prof. Hasse, entitled "*Die Menschenblattern und die Kuhpockenimpfung*," Leipzic, 1852. He refers to Choulant's *Life of Jenner* as his authority, a work which at this moment I am unable to consult. In Mr. Cline's note-book referred to below (p. xiii., foot-note) I find an entry, apparently made in 1780, that "some enquiries and experiments ought to be made relative to the cow-pox."

And now, in his first publication, he announced what, for practical purposes, may be regarded as the fulfilment of that prediction. In a succession of cases he had conducted the lymph to a fifth generation from its source; and the child vaccinated last in the series had been proved, by the test of variolous inoculation, to be no less safe against small-pox than another to whom had been given a first infection from the cow.

Setting aside for the present the question whether this transmission of the vaccine influence from person to person can really and practically be "continued in perpetuity," it may be sufficient to observe, that (1) its transmissibility through at least many successive human bodies, and (2) that large multiplication of lymph which, by the production of new vesicles, occurs at each stage of such transmission, were established fully and solely by Jenner's researches. These are the all-important conditions, under which alone the discovered virtues of cow-pox could be useful for public protection.

Sources of fallacy to be guarded against.

Jenner had now detailed twenty-three cases in which, by vaccination, accidental or experimental, the human system had been rendered, for periods ranging up to 53 years, insusceptible of small-pox inoculation. He had reasonably accounted to himself for the so-called exceptions in the great pathological law which his cases illustrate; exceptions only in appearance; but which had precluded that law from early and general recognition. He had learned that not every eruption on the cow is the specific cow-pox; and that—even from cow-pox—not all inoculation is protective. The disease might be mistaken, or the lymph be spoilt. He had cautioned persons who would repeat his experiments against these sources of fallacy, "lest the want of discrimination should occasion an idea of security which might prove delusive."

Barring such sources of fallacy, he asserted "that the cow-pox protects the human constitution from the infection of small-pox;" and that, by an appropriate procedure—henceforth to be named VACCINATION—this protective influence may be indefinitely communicated and multiplied among mankind.

VACCINATION.

Its first performance in London.[*]

These conclusions were at once accepted, as proven or probable, by persons of judgment and authority in the medical profession. Mr. Cline, then the great teacher of surgery at St. Thomas's Hospital, was, at Jenner's request, the first to verify them by experiment; and early in 1799 Dr. Woodville, of the Small-pox Hospital, with the co-operation of Mr. Pearson, commenced a great series of public vaccinations in London.

Universal corroboration of Jenner's statements.

In these early days of the discovery, almost every case of vaccination was made a test of the alleged protection. Dr. Jenner, writing in 1801, says, "upwards of 6,000 persons have "now been inoculated with the virus of cow-pox, and the far greater part of them have since "been inoculated with that of small-pox, and exposed to its infection in every rational way "that could be devised, without effect;" and Dr. Woodville (giving public evidence in 1802) said that, within two years (1799–1801) there were vaccinated at the Small-pox Hospital 7,500 persons, of whom about one half were subsequently inoculated with small-pox matter, and in none of them did small-pox produce any effect. Other observers, too, had contributed numerous instances of persons who, having accidentally contracted infection from the cow, were found, many years afterwards, capable of resisting all attempts to infect them by inoculation of small-pox.

Conclusiveness of these facts;

These facts told their own story, and they tell it still. They were in themselves sufficient argument; for Jenner's simple truthful style carried conviction. No one candidly studying them (in the first publication and in its supplements of the next two years) could, even at that time, reasonably doubt that, *subject to certain qualifications,* there was now given to society an almost absolute power to control the ravages of small-pox.

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[*] Both in Rose's Biographical Dictionary (art. Jenner) and in Gregory's Lectures on the Eruptive Fevers (p. 187) I read that the first verification of Jenner's discovery was made *in St. Thomas's Hospital.* Neither in Mr. Cline's private case-book, in which that first vaccination is described, nor in Jenner's notice of the experiment (op. cit. p. 128), can I find any mention of the *place* where it was performed; and the name of the patient (Richard Weller) is not to be found in the Hospital books of the period.

under certain qualifications.

Subject, I say, to certain qualifications; for it was not yet proved or tested that infants vaccinated by Jenner's process would permanently enjoy the same complete protection which he had shown to exist in persons who at riper age had contracted accidental cow-pox by their own manipulation of infected cattle; neither was it beyond question whether perhaps the vaccine influence might become progressively though slowly enfeebled by an indefinite length of human transmission. Time, and long time alone, would decide whether these would be over-fastidious doubts; but if, indeed, Jenner did undervalue their remote interest (almost invisible clouds, as they were, in the distance) it may, at least, be said that envy and malice have found no other weakness in his case.

Scientific meaning of cow-pox.

Recent researches:

their results,

and authors.

It was not till forty years afterwards that science supplied an authentic interpretation of Jenner's wonderful discovery. He, indeed, had suspected the solution, and had hinted his meaning when he called cow-pox by the name of *variolæ vaccinæ:*—for such, in fact, it is—*the small-pox of the cow.* It had been an old medical observation that cattle often suffered in the same epidemic with men; certain of their diseases had already (especially by Dr. Layard, in the Philosophical Transactions for 1780) been compared to the human small-pox; and Jenner (says his biographer) "always considered small-pox and cow-pox as modifications of the same "distemper, so that in employing vaccine lymph we only make use of means to impregnate "the constitution with the disease in its mildest, instead of propagating it in its virulent and "contagious form, as is done when small-pox is inoculated."* Researches subsequent to Jenner's, and extending to within the last twenty years, have settled this part of the question.† It has been made matter of almost familiar experiment that the infection of small-pox may, by inoculation, be communicated from man to the cow; that its result is an eruption of vesicles presenting the physical characters of cow-pox; that the lymph from these vesicles, if implanted in the skin of the human subject, produces the ordinary local phenomena of vaccination; that the person so vaccinated diffuses no atmospheric infection; that the lymph generated by him may be transferred, with reproductive powers, to other unprotected persons; and that, on the conclusion of this artificial disorder, neither renewed vaccination, nor inoculation with small-pox, nor the closest contact and cohabitation with small-pox patients, will occasion him to betray any remnant of susceptibility to infection.

The merit of first putting on record these important facts does not belong to England. As early as 1801, Dr. Gassner of Günzburg—after ten unsuccessful trials of small-pox inoculation on cows—had at last succeeded in infecting one; and, with matter taken from the resulting vesicles of this animal, had inoculated four children; who thereupon had developed the ordinary phenomena of vaccination, furnishing vesicles from the lymph of which seventeen other children had been similarly infected. Dr. Gassner's discovery remained for forty years almost entirely unknown or unbelieved; but at length Dr. Thiele, of Kasan, repeated the experiment with equal success, and rendered it still more complete by supplying a necessary test of the nature of the process. He shewed, namely, that the lymph engendered in these experiments possessed, not only the local infectiousness, but likewise the protective powers of cow-pox; that persons recently inoculated with it might with impunity be let sleep in one bed with small-pox patients, or be inoculated with small-pox virus; that, in short, it was true, protective, vaccination which they had undergone. The result of these investigations was not published before the beginning of 1839;* at which time other experiments of the same kind, independent and equally conclusive, were being conducted in this country by Mr. Ceely, of Aylesbury; of whom I am glad to repeat the praise expressed by a high authority, that he "has done more to advance the natural history of vaccination than any other individual since the days of Jenner." Soon afterwards—and also by independent experiments—Mr. Badcock, a long established druggist of Brighton, arrived at the same conclusion as to the origin of cow-pox: and from 1840 to the present time he has constantly been applying his knowledge to its important practical purpose; having within this period again and again derived fresh stocks of vaccine lymph from cows artificially infected by him; having vaccinated with such lymph more than 14,000 persons; and having furnished supplies of it to more than 400 medical practitioners.

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* Much interesting historical information on these points is compiled by Dr. Baron in his fifth chapter, vol. i., p. 162.

† See Heim (who gives an account of Gassner's inquiry and of the local circumstances which nearly deprived him of credit in the matter) in Henke's Zeitschr., Ergänzungsheft xxx. p. 57; Thiele, loc. infra cit.; Ceely, in Transactions of the Provincial Medical and Surgical Association, vol. viii.; Badcock, Detail of Experiments proving the Identity of Cow-pox and Small-pox: Brighton, 1845; also Boston (U.S.) Daily Advertiser, April 14, 1852, where it is stated that Dr. Adams, of Waltham, and Dr. Putnam, of Boston, by a successful repetition of Mr. Ceely's experiments, have been able to "furnish the city and neighbourhood with all the vaccine matter used there since that period;" further, with respect to a different and probably less successful method of variolating the cow, Sunderland, in Hufeland's Journal, 1830. In the above quoted volume of the Trans. Provinc. Med. Surg. Ass. (p. 24) Dr. McMichael is referred to as having in 1828 informed the College of Physicians that in Egypt, on occasion of a failure in the ordinary supply of vaccine lymph, the variolous inoculation of cows was successfully practised, and "fine active vaccine virus produced."

Theoretical interest of these observations.

These researches are mentioned out of their chronological order, because they set in so very clear a light the meaning of Jenner's practice. A host of theoretical objections to vaccination might have been met, or indeed anticipated, if it could have been affirmed sixty years ago as it can be affirmed now:—"This new process of preventing small-pox is really

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* Dr. Thiele's paper is published in the first part, for 1839, of Henke's Zeitschrift für die Staatsarzneikunde, with an editorial note, dated December 1838. At that time the vaccine contagion, which he had originated by small pox inoculation of the cow, had passed through 75 successive human descents, and had been used for vaccinating more than 3,000 persons. I transcribe the paragraph in which Dr. Thiele states his conclusions; and I add to it a further remarkable passage, in which he describes what he believed to be effectual means—independent of the cow—for *artificially reducing small-pox virus* to a state in which its inoculation would produce on the human subject only the ordinary effects of vaccination:—

"1. Die sogenannte Vaccine ist nicht eine den Kühen eigenthümliche, sondern durch Uebertragung der
" Menschenpocken bei ihnen hervorgebrachte Krankheit; und der Mensch und nicht die Kuh, wie man bisher
" geglaubt, ist die Quelle der Vaccine.

"2. Diese so gebildete Krankheit kann durch unmittelbare Uebertragung von Kühen auf Menschen übergehen,
" bringt in ihnen eine identische leichte, vor den natürlichen Blattern schützende, Krankheit hervor.

"3. Durch ein absichtliches methodisches Modificiren und Depotenziren, kann man auch ohne Daswischenkunft
" der Kuh, Schutzblattern hervorbringen.

"4. Diese Schutzblatter hat alle bekannte Eigenschaften der Vaccine, nur in einem zum Wohle der Menschheit
" höheren Grade.

"5. Die vorstehenden, bis jetzt erlangten Resultate berechtigen zu der Hoffnung, dass man zur Milderung der
" epidemisch-contagiösen Krankheiten ein den Schutzblattern ähnliches Mittel wird finden können.

" * * Die Reduction der Menschenpocke zur Vaccine anlangend, so muss die Lymphe aus Menschenpocken
" erst 10 Tage zwischen mit Wachs verklebten Gläsern liegen, und dann mit warmer Kuhmilch verdünnt, gleich der
" gewöhnlichen Vaccine geimpft werden; diese Impfung bildet an den geimpften Stellen grosse Pocken, das die
" gewöhnliche Impfung begleitende einmalige Fieber zeigt sich zweimal, zum erstenmale gegen den 3ten bis 4ten,
" das zweitemal, und zwar heftiger, zwischen dem 11ten und 14ten Tage, die peripherische Röthe ist stärker, und
" nicht blos an der geimpften Stelle, sondern auch neben derselben entstehen zuweilen, jedoch immer nur ganz kleine
" Pocken; die Narbe ist grösser und tiefer wie gewöhnlich, die Ränder derselben zuweilen scharf. Zehn Generationen
" hindurch muss diess Verfahren beobachtet werden, wodurch die Pocke nach und nach ganz der Vaccine gleichkömmt;
" wenn das consecutive Fieber ausbleibt, dann kann man Impfungen von Arm zu Arm ohne Verdünnung der Lymphe
" mit Kuhmilch vornehmen."

" only carrying people through small-pox in a modified form. The vaccinated are safe against " small-pox, because they in fact have had it. Their safety is of the same sort as if they had " been inoculated under the old process, or had been infected by the natural disease. The " trifling disorder which they suffer—these few tender vesicles on the arm, this slight fever- " ishness that they shew—is small-pox of the most mitigated kind; small-pox so modified by " the intermediate animal organization through which it has passed, that, when thus re-intro- " duced to the human body, it excites but insignificant disturbance, and no general exhalation " of infective material."

The subject of vaccination first brought before Parliament.

Returning now to the early history of vaccination, we find that early in 1802 the subject was formally brought under cognizance of the Legislature. By this date Dr. Jenner's " cor- " respondence had become so extensive as to occupy almost all his time, and to make him " a most laborious servant of the public for their great and exclusive benefit, whilst there was " nothing of advantage left to himself but the consciousness that he was so employed; and, " under these circumstances, it was thought that the magnitude of his discovery and the " very disinterested manner in which he was sacrificing his time and his property in diffusing " its blessings, were fit subjects for the consideration of the British Parliament."* On presentation of a petition to this effect, Mr. Addington, then Prime Minister, informed the House of Commons that he had taken the King's pleasure thereon, who strongly recommended it to the consideration of Parliament.

First Parliamentary Committee

The Committee to which the petition was referred, " after examining a number of witnesses of the highest character and most extensive experience in the profession," reported in full corroboration of all that Jenner had alleged.

Subjoined to this Letter is the evidence (App. A.) which Jenner gave before that Committee, and likewise (App. B.) the Committee's Report.†

Its Report.

Admiral Berkeley, the chairman of the Committee, in the speech with which he introduced the Report, made a statement which greatly added to its significance. " In the " investigation of a matter so important to mankind in general, it was not thought right by " the Committee to confine their examination to the petitioner's evidence alone, as is usually " the case, but to sift out any case which could make against it. This conduct, which " certainly may appear to bear hard on the petitioner, has proved a matter of fresh triumph to " him; for although we descended to sift out information from every anonymous letter— " though we raked the very kennels for information against this practice—all that we were " enabled to get is pointed out at full length in the Report; and such were the explanations " on those very cases—such were the testimonies against that evidence—that if Dr. Jenner's " discovery could receive additional lustre from this sort of inquiry, it certainly has done so. " Upon the beneficial effects of this discovery I hardly wish to trouble the Committee (of " Supply) as I am certain, if the Report, which contains the scientific opinion of the first " medical men in this country, does not satisfy the House, the united opinion of all the world, " the homage of Europe which has been paid to the discoverer of this blessing, will have its " due weight on the minds of his countrymen."

First Jennerian Institution.

The verdict was not without its effect. At the close of this year steps were taken, with unprecedented strength of public support, to found by voluntary contributions a society "for the extermination of small-pox;" and on the 3d of February, 1803, the great discoverer took his seat for the first time as President of the Royal Jennerian Institution. This society, "fostered by the most exalted patronage, and adorned by all the learning and talent of the "medical profession of the metropolis," took a very important part in diffusing the first advantages of vaccination. "Thirteen stations were opened in different parts of the metropolis. In "eighteen months they were enabled to announce that 12,288 inoculations had taken place, "and during the same space of time 19,352 charges of vaccine virus were supplied from the "central house to most parts of the British empire, and to foreign countries. .... This society "was also in correspondence with other institutions, and its medical council investigated with "care and fidelity such cases of small-pox as were alleged to have occurred after vaccination."

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* Baron's Life of Jenner, p. 480.

† The Evidence at large, as laid before the House of Commons, respecting Dr. Jenner's Discovery of Vaccine Inoculation, together with the Debate which followed, and some Observations on the contravening Evidence, &c.; by the Rev. G. C. Jenner, 1805.

Early prejudices against vaccination; compared with former prejudices against inoculation of small-pox.

It would have been claiming too much from reason, to expect that this progress could be made without opposition. Eighty years earlier the use of variolous inoculation—a thing of immemorial practice in eastern countries—could not be imported here by those who had witnessed its operation on thousands, without its introduction exciting theoretical (as well as rightly founded practical) objections. How much less, then, could Jenner find an easy reception for his method! It appealed to no national experience. It based itself only on some rustic traditions, and on his few thoughtful observations.

Prognostics,

Great allowance must indeed be made for those who then hesitated to accept this wonderful novelty. The very magnitude of the promised boon almost justified mistrust. And—to persons ignorant of the Gloucestershire experience—that good should accrue from such a source was a strange supposition. Fears were more suggested than hopes.* What could be expected from "a bestial humour" but new and dreadful diseases? Who could see the limit of its "consequences," physical or moral? What security was there against "horns" growing on the vaccinated? What "ideas might arise in the course of time from a brutal fever having excited its incongruous impressions" on the brain? Who knew but that "the human character might undergo strange mutations from quadrupedan sympathy, and some modern Pasiphae rival the fables of old?"

and denunciations,

While these physiological conjectures were gravely pressed upon the public, religion and morality were not less misargued to the same effect.† Leviticus was quoted, with dark insinuations against "contaminating the form of the Creator with the brute creation." Small-pox being a "merciful provision on the part of Providence to lessen the burthen of a poor man's family," was it not "impious and profane to wrest out of the hands of the Almighty these divine dispensations?" What could ensue, on so daring a measure of attempted prevention, but some unimagined punishment?

Reply to these various scruples (where they were sincere) was no difficult matter. Those who feared mysterious bodily changes were answered from the collection of observed facts and experiments; were assured that, in Berkeley, neither horns had grown nor Minotaurs been begotten. To the others—superstitious mistrusters of good—it seemed enough to say that, in this beneficent economy of the world, antidotes are ever scattered side by side with poisons; that not exclusively the latter are of divine gift; that man's duty concurs with his instinct and privilege, to struggle against physical as against moral evil.

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* See especially "Treatise on Lues Bovilla, or Cow-pox" (3 editions) "Commentaries on Lues Bovilla, or Cow-pox" (3 editions) and "Cow-pox Epistle to Rowland Hill" (7 editions) all by B. Moseley, M.D., Member of the Royal College of Physicians of London, and of the University of Leyden; likewise other works mentioned below.

† "Cow-pox Inoculation no Security against the Small-pox Infection," by W. Rowley, M.D., Member of the University of Oxford, and of the Roy. Coll. Physicians; "Serious Reasons for uniformly objecting to the Practice of Vaccination," by John Birch, Surgeon to St. Thomas's Hospital. Over Mr. Birch's remains, within one of the City churches (Rood Lane), a monument erected by his sister commemorates, that "the Practice of Cow-poxing, which first became general in his day, Undaunted by the overwhelming influence of power and prejudice, And the voice of Nations, He uniformly and until Death (1815) perseveringly opposed."

and inventions.

Up to a certain point, the weaker side in a controversy is apt to grow noisier with defeat. In proportion as Jenner's merit became recognised by Parliament and the public, those who had committed themselves to opposition became more and more vehement against his matchless discovery. All that had been predicted was now, they said, in fulfilment. The nation, unconsciously, was dying of vaccination. Terrible portents were described.* A child at Peckham had its former natural disposition absolutely changed to the brutal, so that it ran upon all fours like a beast, bellowing like a cow, and butting with its head like a bull! Sarah Burley's face was distorted, and began to resemble that of an ox! Master Joules, similarly degenerating, became the ox-faced boy—a proverb and a frontispiece! A lady's daughter coughed like a cow, and had grown hairy all over her body! William Ince, too, had grown patches of hair not resembling his own, but of the same colour, length, and quality as that of a cow! Many had suffered like him! Some also squinted as only oxen can squint! Others had lost their nails and the ends of their fingers! Eruptions, ulcers, mange, abscesses, scabs and blotches, glandular tumours and diseased joints and decaying bones, fevers and blindness, and gangrene and convulsions, were multiplying among the victims of Jenner! Deaths, of course, were plentiful. And on what but vaccination could they depend? It was the old story again:—

> Post ignem æthereâ domo
> Subductum, macies et nova febrium
> Terris incubuit cohors;
> Semotique prius tarda necessitas,
> Lethi corripuit gradum.

Facts

Such was the experience of the opposition. Divested of its more ludicrous imaginations, and some allowance being made for an occasional unskilfulness of those who pretended to vaccinate, all resolves itself into the one not uncommon error, of confounding what is fact with what is opinion or inference. A child coughed: to the ears of the vaccinophobist, the sound was as of a cow; to his intellect, it was the effect of vaccination. A child was ugly or squinting, or it had those skin eruptions which have always been frequent incidents of infancy: at once, to the alarmist, there was *vultus taurinus* or *tinea bovilla*. In a word, the oldest and most familiar diseases were thus re-named, in conformity with a belief that vaccination was causing them; while, in reality, there was no more reason in this belief, than if vaccination had been charged with occasioning infants to cut their teeth, or with leading boys to prefer cricket to Cornelius Nepos.

Last appeals.

As the chances of the opposition became less hopeful, so did their language grow worse and their arguments more wild.† Placards and caricatures were resorted to. Tender points were aimed at. Were persons about to marry—might not vaccination injure their fortune in life? Might there not be a disclosure of shocking facts? And was nothing due to patriotism? Evil and Buonaparte (1807) and Vaccination are allowed to triumph for a time, perhaps as the scourge and punishment of our sins:—but shall we submit because they have for awhile been prosperous? No! Britons never, never, &c.!

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* "Dissertation on the Failure and Mischief of Cow-pox," and "Cow-pox exploded," both by G. Lipscomb, Surgeon; "Observations on the Pernicious Consequences of Cow-pox Inoculation" (3 editions) by R. Squirrell, M.D. The last-named author certainly did his utmost to produce the results which he predicted. Not content with being struck "with such horror and aversion that he could not as a man of honour or feeling submit to or coincide with vaccination," he recommended those who had already undergone the operation immediately to submit themselves to a course of treatment to "eradicate every particle of the cow-pox virus out of the blood." His treatment was mercury. The consequences may be imagined. See also (contra) "Letters to Dr. Rowley on his late Pamphlet" (with a frontispiece) by Aculeus; "The Vaccine Contest," by William Blair; and "Treatise on Cow-pox," by John Ring.

† Rowley, op. cit.; also F. Smyth Stuart's "Letter on the Subject of Coercive Vaccination," and "£30,000 for the Cow-pox." To this author's fancy vaccination was "a mighty and horrible monster with the horns of a bull, "the hind hoofs of a horse, the jaws of the kraken, the teeth and claws of a tyger, the tail of a cow, all the evils of "Pandora's box in his belly; plague, pestilence, leprosy, purple blotches, fœtid ulcers, and filthy running sores covering "his body, and an atmosphere of accumulated disease, pain and death around him, which had made his appearance in

Present interest in this obsolete literature.

You will find it difficult to believe that the very oldest of this nonsense, which I have transcribed, was written in England within sixty years of the present time. By us, for half a century, it has been forgotten; or only recalled as an echo by occasional last words from the continent, where, far off, there is seen sometimes a feeble wave still rippling from that old flood of ours. It is wearisome work to read stuff so stupid or so dishonest. But I have ventured to trouble you with it, as with some other parts of this narrative, in order that it may plainly be seen how little of suddenness or surprise there was in the first social successes of vaccination; how everything possible and impossible was affirmed against it; how all weaknesses and prejudices were appealed to; how every inch of progress was contested; and how little it can be said that Jenner stole a march on the public mind. Further (because there is nothing new under the sun, and the wheel of time brings back the follies of the past oftener than its wisdom) it may become necessary, in case these doctrines should emerge again from obscurity, to refer to their right authors the praises of original invention, and to remember that fifty years ago such objections were examined and refuted and condemned.

Public doubts

For, when those outcries were raised, the public naturally hesitated, and asked for explanation. Moseley and Squirrell and Rowley and Birch and Lipscombe and even Stuart were, no less than Jenner, members of the medical profession. To the uninitiated, it was Doctor against Doctor.

Under these circumstances two inquiries were successively instituted.

Report of Royal Jennerian Institution.

First in 1805, "the medical council of the (then) Royal Jennerian Institution, having been " informed that various cases had occurred which excited prejudices against vaccine inoculation, and tended to check the progress of that important discovery in the kingdom, " appointed a committee of twenty-five of their members to inquire into the nature and truth " of such cases." The Report in which the council recorded the result of this inquiry, contains much which is as applicable to the present occasion as to the circumstances of that time. I therefore subjoin it (App. C.) for your consideration; begging merely to observe, that among the members of this council and committee were not only surgeons and physicians of the largest practice and highest character in London, but especially some whom the profession of that day would have selected as the most competent persons in England to pronounce on the questions at issue. You will observe that minute inquiry was made, not only into allegations then current against the protective powers of vaccination, but also into "opinions and assertions which charged the cow-pox with rendering patients liable to particular diseases;" and that the council, after having detailed the results of this inquiry, "cannot " conclude their report upon a subject so highly important and interesting to all classes of " the community, without making this *solemn Declaration*:—

"*That in their opinion, founded on their own individual experience, and the information* " *which they have been able to collect from others, mankind have already derived great and incal-*

" the world and was devouring mankind—especially poor helpless infants, not by scores only or hundreds or thousands, " but by hundreds of thousands." The author assists his description by an engraved caricature:—Dr. Jenner and other ministers of vaccination (distinguished from ordinary practitioners of medicine by the addition of cowtails and horns) are discharging large hampers of children into the mouth of the monster; while another (apparently Dr. Thornton) officiates behind with a spade, and shovels into a nightman's cart the undigested remains of this diet. From the distance are advancing to the rescue Drs. Moseley, Squirrel, and Rowley, with Messrs. Birch and Lipscombe, "the men, the heroes," to whom also an obelisk is erected in the right background. Perhaps it may have been in this unattractive guise that vaccination was first introduced to Philadelphia, where (see Baron's Life of Jenner, vol. i. p. 442) "the leading physician pronounces it too beastly and indelicate for polished society."

" *culable benefit from the discovery of vaccination: and it is their full belief, that the sanguine* " *expectations of advantage, and security, which have been formed from the inoculation of the* " *cow-pox will be ultimately and completely fulfilled.*"

Discussion in Parliament.

The second inquiry was even more critical. The then Chancellor of the Exchequer, (now Lord Lansdowne) asked the attention of the House of Commons (July 2, 1806) " to a subject of general importance ... totally unconnected, indeed, with all party prin" ciples ... but concerning the welfare, health, and existence of a large portion of His " Majesty's subjects, and therefore well deserving of the consideration and support of " Parliament; ... that very remarkable discovery ... a substitute for the loathsome small-pox, " an evil which has spread a dreadful desolation throughout the whole world. He stated to " the House facts, derived from the experience of vaccination in (alas!) other countries than " England, illustrative of those advantages to society which we were neglecting to realise. " He expressed a profound regret, that in this country alone, in which the discovery had " originated, the salutary practice of vaccine inoculation had been undergoing a retrograde " movement. He referred to the objections and to the manner in which they had been " promulgated; to prejudices which had been excited, and to their fatal effect in bringing " back nearly that average degree of depopulation which had been experienced previous to " the introduction of the vaccine discovery. He had not the smallest inclination to " propose any compulsory measures, ... but felt it a duty incumbent on him ... to submit a " plan by which the House should become possessed of a mass of evidence as to the real " merits of this discovery; ... a procedure which would tend to enlighten the public, by " informing them in a formal and regular manner of what appeared to be the truth, ... and " would give this valuable discovery the advantage of having all the weight of promulgation " which the high character and popularity of Parliament is capable of. He concluded by " moving that an humble address be presented to His Majesty, praying that He will be " graciously pleased to direct His Royal College of Physicians to inquire into the state of " the vaccine inoculation in the United Kingdom, and to report their opinion as to the " progress which it has made, and the causes which have retarded its general adoption." Mr. Wilberforce (from the other side of the House) and Mr. Windham (then Secretary of State) with others, spoke at length and with great earnestness, in the same general sense as Lord Henry Petty; so the motion passed *nem. con.*

Report of Royal College of Physicians.

Nine months passed before the College of Physicians (April 1807) made its Report:— " *Deeply impressed with the importance of an inquiry which equally involves the lives of indi*" *viduals and the public prosperity, they had made every exertion to investigate the subject fully* " *and impartially: In aid of the knowledge and experience of the members of their own body,* " *they had applied separately to each of the Licentiates of the College; they had corresponded with* " *the College of Physicians of Dublin and Edinburgh; with the College of Surgeons of London,* " *Edinburgh, and Dublin; they had called upon the Societies established for Vaccination for an* " *account of their practice, to what extent it had been carried on, and what had been the result* " *of their experience; and they had by public notice invited individuals to contribute whatever* " *information they had severally collected.*"

An inquiry of this nature and extent, conducted under a sufficient sense of responsibility by the first medical corporation of the kingdom, could not fail to deserve public confidence. Nearly every passage in the Report applies to the present juncture, as well as to the purpose for which it was written; and I subjoin the whole of it (Appendix D.) as recording by far the most important investigation to which Jenner's discovery has been submitted in the country of its birth. Having already quoted the words with which the Report opens, I will here also repeat the remarkable paragraphs which close it:—

“ *The College of Physicians feel it their duty strongly to recommend the practice of vaccination. They have been led to this conclusion by no preconceived opinion, but by the most unbiassed judgment, formed from an irresistible weight of evidence which has been laid before them. For, when the number, the respectability, the disinterestedness, and the extensive experience of its advocates is compared with the feeble and imperfect testimonies of its few opposers; and when it is considered that many, who were once adverse to vaccination, have been convinced by further trials, and are now to be ranked among its warmest supporters, the truth seems to be established as firmly as the nature of such a question admits; so that the College of Physicians conceive that the public may reasonably look forward with some degree of hope to the time when all opposition shall cease, and the general concurrence of mankind shall at length be able to put an end to the ravages at least, if not to the existence, of the small-pox.*”

The discussion exhausted.

With this Report terminates, for all practical purposes, the early history of vaccination in England. The result was of course brought (July 29, 1807) under notice of the House of Commons; and again, in such a debate as is seldom given to matters of concord, the foremost members of the House honoured themselves by honouring the great benefactor of mankind. Henceforth, the public mind was apparently quite satisfied on the subject;* and from this period, I repeat, begins to date the almost universal vaccination of children of the educated classes in this country.

General assent of the medical profession.

The general assent of the Medical Profession dated from an earlier period, and soon became all but unanimous. An infinitely small amount of *boná fide* dissent probably continued; in reference to which I will only observe, that allowance must be made for two sorts of personal influence which tended, and perhaps still tend, to occasion it.

Individual exceptions.

Even now, among the living contemporaries of Jenner's discovery, there must be men whose fathers and friends and teachers of fifty years back denounced the new practice. Among such as remember the warmth of that contest, perhaps not all discriminate the error. The old allegiance of studentship binds, possibly, here and there a surviving follower of Birch. An hereditary admirer of small-pox inoculation, he may remember only its advantages as compared with the evils of natural small-pox; may forget the fatal objections to its general employment, and may still hesitate to replace that practice of his youth by the “speculative novelty” of vaccination.

Also to a very small extent allowance must be made for personal eccentricities, which—in respect of vaccination, as of every other subject—have ever caused solitary voices to be raised against the common convictions of mankind. This influence can scarcely cease to operate. Occasionally, no doubt, till the end of time, there will be found some lover of paradox, ready, in mere wantonness of authorship, to choose his text from Squirrell or Rowley, and to write dispraise of Jenner, as Cardan wrote encomiums on Nero.

Subject only to these qualifications, it may be said, as regards England, that the convictions of the medical profession on this important matter were fixed fifty years ago. Even then, probably, they would have been expressed with the same sort of unanimity as prevails among the professors of any other department of knowledge, in respect of their most familiar and elementary teaching.

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* There always has been, and there always must be a kind of opposition to which my text does not refer, and against which it would be ridiculous to argue. What has sounded like a voice of dissent has sometimes been only the jingle of an advertising cart. What has looked like a conflict of opinion has sometimes been the mere hustling of pickpockets in the crowd. For quacks with their touters have often found it convenient to hitch themselves on to the skirts of a discussion in which the public has been interested; ready for any chance of reviling the science which condemns their wretched arts; but above all, eager to assure their dupes that, while vaccination is so worthless a precaution, life may be prolonged and youth made perpetual by one incomparable pill or elixir.

Whether my present inquiry has brought to light any subsequent divergence of opinion, is a question on which the evidence (App. E. to K.) is before you, and to which I shall presently return.

III.—SMALL-POX SINCE THE USE OF VACCINATION.

Evidence on the protectiveness of vaccination must now be statistical.

IN the earlier days of Jenner's discovery the evidence which led men to adopt vaccination depended on a somewhat minute inquiry into individual cases. In thousands of instances (as I have already mentioned) the patient, after being vaccinated, was deliberately tested by inoculation with small-pox matter; in other instances, chance supplied equivalent means of trial; and the results of these very numerous experiments were sufficiently uniform to convince the public judgment.

At present it may be reasonably claimed that the evidence shall be of a more comprehensive kind. From individual cases the appeal is to masses of national experience. Tested by half a century's trial on the millions of civilized Europe, what has vaccination achieved? Comparing the small-pox mortality of the last forty or fifty years with that of as many years in the last century, do we find a sensible difference? Has progress been made towards that final result which (App. A.) Jenner anticipated,—the annihilation of the most dreadful scourge of the human species?

Foreign information obtained by the Epidemiological Society.

In respect of certain countries, these questions are admirably answered in papers already before Parliament. Four or five years ago the Epidemiological Society of London appointed a committee of its members to conduct inquiries connected with small-pox and vaccination. The committee, having obtained from foreign governments the communication of most important statistical facts as to the decline of small-pox, reported (inter alia) these results to the Society; and soon afterwards this valuable report (specially the work, I believe of Dr. Seaton, honorary secretary to the committee) was ordered to be printed for presentation to both Houses of Parliament.

Its results in a tabular form.

For reasons with which I need not trouble you, I neither quote at length the statistical tables of that Report, nor exactly follow their form; but, extracting from the foreign communications of its Appendix such particulars only as relate to *Population* and *Small-Pox*, and distinguishing these into two periods, I obtain all requisite means for comparing the past and present ravages of the disease. On this plan the following table has been constructed; and in observing the last columns (calculated by Mr. Haile from the materials referred to) you will notice, side by side, two series of facts:—1st, how many persons in each million of population annually died of small-pox *before* the use of vaccination; and 2dly, how many persons in each million of population have annually died of small-pox *since* the use of vaccination. And lest these facts should appear a whit stronger or less strong than they really are, I have set in the other side of the table, opposite the name of each territory, a statement of what periods of time are referred to in the particular comparison.

The results are truly conclusive.

Contrast of periods before

Compare, for instance, in the case of Sweden, the twenty-eight years before vaccination*

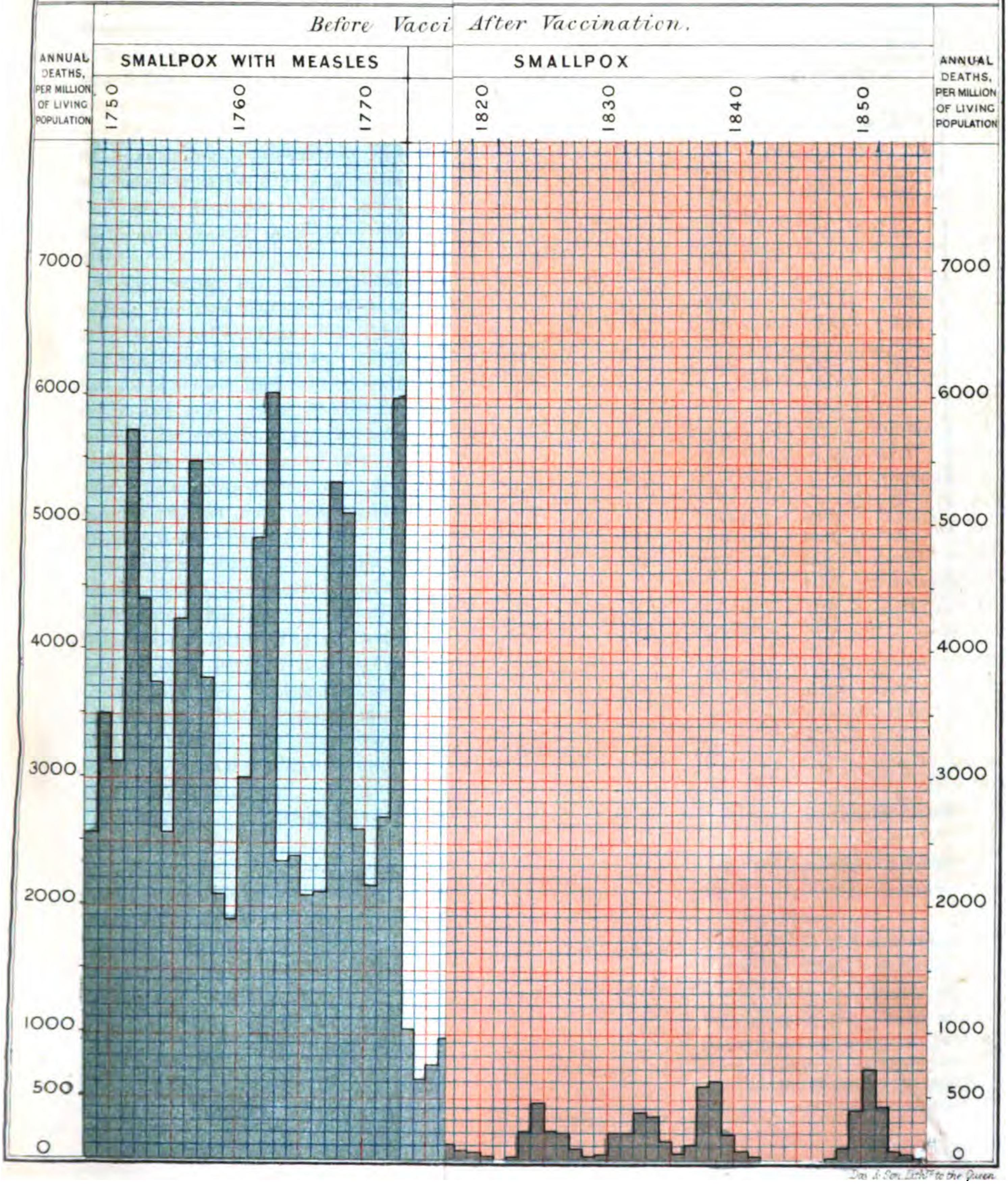
See Diagram appended. ☞

* The small-pox death-rate for this earlier period has been calculated from the numbers given in an important paper (App. p. 185) which we owe to the Swedish Board of Health. It is on the same paper that the annexed Diagram is founded, which represents the annual fluctuations of small-pox mortality in Sweden for the last 82 years, and less perfectly for the 25 years previous. Before 1774, measles and small-pox were unfortunately not distinguished in the mortuary registers of the kingdom; so that the first section of the table must be read with allowance for this combination. During the period referred to in the text small-pox deaths were separately enumerated, and of course are alone counted in the estimate there given of the small-pox death-rates for 1774–1801 and 1810–50. The first

face p. XXII.

SMALLPOX DEA OR THE 107 YEARS 1749_1855

C Swedish Government.



Day & Son, Lithrs to the Queen.

with forty years soon afterwards:—during the earlier period there used to die of small-pox, out of each million of the Swedish population, 2,050 victims annually;—during the later period, out of each million of population, the small-pox deaths have annually averaged 158.

and after vaccination in Austria, Prussia, Sweden, and Copenhagen.

Or compare two periods in Westphalia: during the years 1776–80, the small-pox death-rate was 2,643: during the thirty-five years 1816–50, it was only 114.

Or taking together the three lines which belong to Bohemia, Moravia, and Austrian Silesia, you find that where formerly (1777–1806) there died 4,000, there now die 200.

Or taking two metropolitan cities; you find that in Copenhagen, for the half century 1751–1800, the small-pox death-rate was 3,128, but for the next half century only 286; and still better in Berlin, where, for twenty-four years preceding the general use of vaccination, the small-pox death-rate had been 3,422, for forty years subsequently it has been only 176.

In other words, the fatality of small-pox in Copenhagen is but an eleventh of what it was; in Sweden little over a thirteenth; in Berlin and in large parts of Austria, but a twentieth; in Westphalia but a twenty-fifth. In the last-named instance, there now die of small-pox but four persons, where formerly there died a hundred.

Terms of Years respecting which Particulars are given.	Territory.	Approximate Average Annual Death rate by Small-pox per Million of Living Population.	
		Before Introduction of Vaccination.	After Introduction of Vaccination.
1777–1806 and 1807–1850 .	Austria, Lower.......	2,484	340
1777–1806 and 1807–1850 .	„ Upper and Salzburg	1,421	501
1777–1806 and 1807–1850 .	Styria	1,052	446
1777–1806 and 1807–1850 .	Illyria	518	244
1777–1806 and 1838–1850 .	Trieste............	14,046	182
1777–1803 and 1807–1850 .	Tyrol and Voralberg	911	170
1777–1806 and 1807–1850 .	Bohemia	2,174	215
1777–1806 and 1807–1850 .	Moravia	5,402	255
1777–1806 and 1807–1850 .	Silesia (Austrian) ..	5,812	198
1777–1806 and 1807–1850 .	Gallicia...........	1,194	676
1787–1806 and 1807–1850 .	Bukowina	3,527	516
1817–1850 .	Dalmatia..........	.. .. ..	86
1817–1850 .	Lombardy.........	.. .. ..	87
1817–1850 .	Venice............	.. .. ..	70
1831–1850 .	Military Frontier ...	.. .. ..	288
1776–1780 and 1810–1850 .	Prussia (East. Prov^{s})	3,321	556
1780 and 1810–1850 .	Prussia (West. Prov^{s})	2,272	356
1780 and 1816–1850 .	Posen	1,911	743
1776–1780 and 1810–1850 .	Brandenburgh	2,181	181
1776–1780 and 1816–1850 .	Westphalia	2,643	114
1776–1780 and 1816–1850 .	Rhenish Provinces ..	908	90
1781–1805 and 1810–1850 .	Berlin	3,422	176
1776–1780 and 1816–1850 .	Saxony (Prussian) ..	719	170
1780 and 1810–1850 .	Pomerania	1,774	130
1810–1850 .	Silesia (Prussian) ...	.. .. ..	310
1774–1801 and 1810–1850 .	Sweden	2,050	158
1751–1800 and 1801–1850 .	Copenhagen........	3,128	286

Other national statistics are not sufficiently accurate for the purposes of an equally exact comparison.

From such information as exists (vid. seq. pp. xxx., xxxi.) it seems probable that the small-pox death-rate of London within the Bills of Mortality, during the eighteenth century, ranged from 3,000 to 5,000. During the ten years 1846–55, it was under 340.

Dr. Lettsom, in his evidence before the Parliamentary Committee of 1802, stated reasons for estimating the small-pox death-rate of England at about 3,000; and Dr. Blane's evidence was nearly to the same effect. Reference to the adjoining table (where the death-rates of other countries are given) and to subsequent tables (where the death-rate of London at different periods is minutely examined) leads me to believe that such an estimate by no

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successful vaccinations in Sweden were performed at the end of 1801, namely (in Malmö) November 23, and (in Stockholm) December 17. About 1810, the vaccinations were amounting to nearly a quarter of the number of births.

means exaggerates our average losses before the discovery of vaccination. In contrast therewith I shall hereafter have occasion to show, that for the years 1841–53 the average small-pox death-rate of England and Wales was only 304; in 1854, only 149; in 1855, only 132.

Further exclusion of Small-pox in proportion as vaccination is general.

But even the later rates, reduced as they are, belong to a population of which some considerable section is unprotected; and it is easy to observe, that, in proportion as vaccination becomes more general among the given number of persons, so is the small-pox death-rate further lessened. Sufficient proofs are given by those public establishments—army, navy, and schools—in which it is the rule to vaccinate on admission all unvaccinated subjects who do not show marks of previous small-pox. Thus, in an important paper, which I subjoin (App. E., reprinted from the *Transactions of the Medical and Chirurgical Society of London*) Dr. Balfour shows that the small-pox mortality of the British navy has not reached a third, nor that of the British army a fourth, of the London rate; and that in the experience of the Royal Military Asylum for 48 years (within which time 5,774 boys have been received for training) only four deaths by small-pox have occurred, and *these all in non-vaccinated boys* who were believed already to have suffered small-pox once before becoming inmates of the school. In two severe epidemics of small-pox which prevailed in Malta in the years 1830–1 and 1838–9, the death-rate of the general population was just twenty times the death-rate of the military population.* Other evidence of the same nature may be collected from materials in the Appendix, to which I shall hereafter more particularly refer.

A check.

It is a vast improvement which the above figures demonstrate. Yet, unequalled as have been already the benefits to mankind conferred by the discovery of vaccination, the gain would have been greater but for a disappointment, which I have now to mention.

Post-vaccinal small-pox.

In the early days of vaccination it was noticed that every now and then small-pox would attack a person said to have been vaccinated. Enemies used this fact with so much exaggeration and spiteful triumph that sober persons at first hardly gave it the attention it deserved. But though often vaunted in mere malice, it was in substance true, that vaccinated persons did not, even then, *invariably* resist small-pox. In the two reports (1806 and 1807) to which I have already referred, these exceptional failures were admitted in the following terms:—

Early illustrations.

First, (Rept. R. Jenn. Institution, seq. page 4):—

> "That most of the cases which have been brought forward as instances of the failure of vaccination to "prevent the small pox, and which have been the subjects of public attention and conversation, are either "wholly unfounded or grossly misrepresented: that many persons have been declared duly vaccinated, when "the operation was performed in a very negligent and unskilful manner, and when the inoculator did not "afterwards see the patients, and therefore could not ascertain whether infection had taken place or not; and "that to this cause are certainly to be attributed many of the cases adduced in proof of the inefficacy "of the cow-pox: that some cases have been brought before the Committee on which they could form no "decisive opinion, from the want of necessary information as to the regularity of the preceding vaccination, "or the reality of the subsequent appearance of the small-pox: that it is admitted by the Committee that a "few cases have been brought before them, of persons having the small-pox, who had apparently passed "through the cow-pox in a regular way: that cases, supported by evidence equally strong, have been also "brought before them of persons who, after having once regularly passed through the small-pox, either by "inoculation or natural infection, have had that disease a second time: that in many cases in which the small-"pox has occurred a second time after inoculation or the natural disease, such recurrence has been particu-"larly severe and often fatal; whereas, when it has appeared to occur after vaccination, the disease has "generally been so mild as to lose some of its characteristic marks, and even sometimes to render its existence "doubtful."

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* Wunderlich's Handbuch der Pathologie u. Therapie, vol. iv. p. 207.

And, secondly, (Rept. Coll. Physicians, seq. page 7):—

" The security derived from vaccination against the small-pox, if not absolutely perfect, is as nearly so " as can perhaps be expected from any human discovery; for among several hundred thousand cases, with " the results of which the College have been made acquainted, the number of alleged failures has been sur- " prisingly small, so much so as to form certainly no reasonable objection to the general adoption of vaccina- " tion; for it appears that there are not nearly so many failures in a given number of vaccinated persons as " there are deaths in an equal number of persons inoculated for the small-pox: nothing can more clearly " demonstrate the superiority of vaccination over the inoculation of the small-pox than this consideration; and it " is a most important fact, which has been confirmed in the course of this inquiry, that in almost every case " where the small-pox has succeeded vaccination, whether by inoculation or by casual infection, the disease has " varied much from its ordinary course; it has neither been the same in violence nor in the duration of its " symptoms, but has, with very few exceptions, been remarkably mild, as if the small-pox had been deprived, " by the previous vaccine disease, of all its usual malignity."

Increased numbers.

During the next twenty or thirty years the proportion of these puzzling cases was constantly on the increase, and in some epidemic seasons they presented a very alarming total.

Excessive anxiety;

Allowance might be made for many instances in which vaccination had evidently been performed without care or knowledge; for some, in which spurious lymph had been used; for others, in which the immediate success of the operation had not been verified, and so forth; but, with all reasonable deduction from the aggregate, there still remained much to perplex and disappoint every honest observer. Injudicious friends of vaccination strove to disguise these facts; but there were still living some of their old antagonists who were not sorry to have another chance of victory; and happily there were also competent inquirers willing to look only for truth in the matter. And at no moment in the progress of Jenner's discovery had impartial investigation been more needed than now; for, partly by the facts themselves, and partly by hostile over-statement of them, public confidence began to be disquieted. There seemed a breach in the contract under which vaccination had been accepted. In what had promised so much, failures were all the more conspicuous: men looked to them, even where most exceptional, rather than to the successes of vaccination; and there were (1820—35) not a few persons whose minds began to misgive them, whether the old plan of small-pox inoculation had not perhaps been too easily abandoned.*

which further observations relieved.

To us, in the present day, this doubt cannot occur. The statistics I have quoted show beyond question that, whatever partial unexpected weakness may have been discovered in the protectiveness of vaccination, still—even with that weakness—its adoption has been followed by a reduction of small-pox mortality to a tenth and a twentieth of its former magnitude. But, in fact, long before these statistics could be compiled, popular observation, with rough and ready induction, had come to the same result.

Habitual mildness of post-vaccinal small-pox.

Every one could see that a vast majority of vaccinated persons escaped small-pox; every one could also see that if a vaccinated person caught small-pox he suffered from it comparatively little. And on those very occasions when the large number of persons suffering small-pox after vaccination was most calculated to weaken confidence in its absolute powers of prevention, there were the best opportunities to learn that if it sometimes failed to prevent, at least it might be relied on to mitigate.

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* Persons entertaining this doubt overlooked a possibility which happily for mankind has never been fully tested—a possibility that small-pox inoculation, *if it had been generally adopted at a sufficiently early period of life to prevent infantine deaths by natural small-pox,* might itself have proved in many instances an impermanent protection. The following passage from the French Academical Report on the vaccinations of 1850 (p. 25) points in the direction here suggested, but is not sufficiently definite for a proof:—" L'inoculation elle-même n'était pas plus efficace. De " tous temps on a cité des faits contre son infallibilité. Elle n'a pu se soutenir en Chine au delà de cinquante ans; " après qui des épidémies sont venues qui en ont montré les faiblesses; et, sans chercher si loin, M. Debourge de Rollot " nous apprend que sous le règne d'une épidémie à Edimbourg et dans le Devonshire les inoculés ont eu plus à se " plaindre que les vaccinés." In the French Report there are no references which might enable the reader to verify these important assertions, and study in detail the experience which they represent.

[illegible] permanent [illegible]."

[illegible] some years afterwards [illegible] small-pox epidemic [illegible] was carried on until I had had an oppor- [illegible] affected with small-pox after vaccination [illegible] the disease in that form which [illegible] cases of small-pox in persons who had pre- [illegible] small-pox, and of this number three [illegible], I saw also [illegible] cases of primary small-pox, [illegible] of which [illegible] the protective effects of vaccination. [illegible] Small-pox has twice prevailed epidemically [illegible], and from all I have seen and heard I am satisfied that the propor- [illegible] of patients I have mentioned did not materially differ [illegible]. In the first of these epidemics the deaths that occurred in the [illegible], and in the second chiefly, I believe, of adult females."

[illegible] at Marseilles [illegible] the numbers of cases and of deaths in the severe epidemic of 1828, and their proportion to the vaccinated, non-vaccinated, and [illegible] masses of exposed population, were stated as follows; the first column of figures representing an [illegible] can only be approximate, [illegible] for the purpose by the [illegible] de Médecine:

	Number.	Cases of Small-pox.	Deaths by Small-pox.
Total number of persons at the ages (0–30), which were almost exclusively susceptible - -	40,000	6,020	1,024
1. Protected by previous small-pox	2,000	20	4
2. Protected by vaccination -	30,000	2,000	20
3. Unprotected - - -	8,000	4,000	1,000

[illegible], p. 148. In explanation of the very large number of cases of post- [illegible] by Dr. Thomson, it must be observed, that *chicken-pox* was epidemic in Scotland at [illegible]; and Dr. Thomson, considering these diseases to be of identical nature, counted them both [illegible] his "Account of the Varioloid Epidemic, 1820," and "Historical Sketch of Opinions [illegible] of Small-pox," 1822.

† [illegible] de la Vaccine; Paris, 1833; p. 195.

Copenhagen.

So also (as quoted by Steinbrenner) in Copenhagen:—of 659 vaccinated persons who suffered in the variolous epidemics 1823–7, only five died, being at the rate of 1 in 132; while of 176 unvaccinated persons who caught the disease, more than a fourth seem to have died; and of 153 others, who professed previously to have had small-pox, there died 31. And similarly in the epidemic of 1828–30, and part of that of 1832–7, it seems that out of 228 unprotected patients 63 had died; but of 1,373 cases of post-vaccinal small-pox only 14 were fatal.

Numerous other illustrations.

Observations, more or less to the same effect, have been made, I believe, in every country to which vaccination has extended, and at every time when epidemic small-pox has prevailed. Sometimes the difference has seemed less, sometimes more; but difference, and very great difference, in favour of vaccinated persons, as regards the severity of small-pox, if it should happen to befal them, is made certain by the general and strong testimony of innumerable observers. The adjoining illustrations* are selected from various sources, and it would be easy to multiply their number to any desired extent. The largest illustrations are generally least likely to be deceptive: I would therefore point especially to the case of Bohemia, where (according to observations made for twenty-one years on four millions of people) the risk of death to vaccinated persons, if they happen to contract small-pox, is at the rate of $5\frac{1}{6}$ per 100 patients; but to non-vaccinated persons, when they contract small-pox, at the rate of $29\frac{4}{5}$ per 100 patients; or to the concurrent testimony of London, Milan, and Vienna, as showing, on an experience of nearly 26,000 cases, that post-vaccinal small-pox, if it occurs, is but a fifth or a sixth as dangerous as natural small-pox.

Places and Times of Observation.	Total Number of Cases observed.	Death-rate per 100 Cases.	
		Among the Unprotected.	Among the Vaccinated.
France,‖ 1816–41 - - -	16,397	$16\frac{1}{8}$	1
Quebec,* 1819–20 - -	?	27	$1\frac{2}{3}$
Philadelphia,† 1825 - - -	140	60	0
Canton Vaud,† 1825-9 - -	5,838	24	$2\frac{1}{6}$
Darkehmen,† 1828–9 - - -	134	$18\frac{4}{5}$	0
Verona,‡ 1828–39 - - -	909	$46\frac{2}{3}$	$5\frac{2}{3}$
Milan,** 1830–51 - - -	10,240	$38\frac{1}{8}$	$7\frac{2}{3}$
Breslau,† 1831–3 - - -	220	$53\frac{1}{3}$	$2\frac{1}{6}$
Wirtemberg,†† $1831\frac{1}{2}$–$5\frac{1}{2}$ - -	1,442	$27\frac{1}{5}$	$7\frac{1}{10}$
Carniola,§ 1834–5 - - -	442	$16\frac{1}{4}$	$4\frac{2}{3}$
Vienna Hospital,† 1834 - -	360	$51\frac{1}{4}$	$12\frac{1}{2}$
Carinthia,§ 1834–5 - - -	1,626	$14\frac{1}{2}$	$\frac{1}{2}$
Adriatic,† 1835 - - -	1,002	$15\frac{1}{8}$	$2\frac{4}{5}$
Lower Austria,† 1835 - - -	2,287	$25\frac{4}{5}$	$11\frac{1}{2}$
Bohemia,¶ 1835–55 - - - -	15,640	$29\frac{4}{5}$	$5\frac{1}{6}$
Gallicia,† 1836 - - -	1,059	$23\frac{1}{2}$	$5\frac{1}{7}$
Dalmatia,† 1836 - - -	723	$19\frac{2}{3}$	$8\frac{1}{4}$
Lond. Small-pox Hospital,¶ 1836–56	9,000	35	7
Vienna Hospital,¶ 1837–56 - -	6,213	30	5
Kiel,¶ 1852–3 - - -	218	32	6
Wirtemberg,‖ no date - - -	6,258	$38\frac{9}{10}$	$3\frac{1}{2}$
Malta,‡‡ no date - - -	7,570	21·07	4·2
Epidemiolog. Soc. Returns, ‡‡ no date	4,624	19·7	2·9

Danger of small-pox to persons nominally vaccinated chiefly dependent on badness of vaccination.

This, however, is only a part of the case; and I venture especially to beg your attention to what remains, as it is of much administrative importance. When the above and similar statistics

* Thomson, Small-pox, p. 376. The Quebec epidemic is described to "have "spread rapidly among the unvaccinated, and carried off many adults as well as "children. The proportion of deaths in the unvaccinated was from 1 to $3\frac{1}{2}$ to "1 in 4."

† Steinbrenner, op. cit. pp. 105, 110, 231, 232, 280, 281, 283, 295. In the Breslau epidemic, one patient is stated to have suffered small-pox for a third time.

‡ Rigoni-Stern, as quoted (p. 50) by Prof. Haeser; die Vaccination und ihre neuesten Gegner, 1854. It is mentioned that of twenty-four persons who during this period suffered second attacks of small-pox, no fewer than eight died.

§ Med. Jahrb. d. Œesterr. Staates, 1838.

¶ Details annexed in Supplement. The twenty years' experience of the Vienna Hospital is detailed in the Report of the College of Surgeons, and in the statement of Professor Hebra.

‖ Wunderlich's Handbuch d. Path. u. Therap. 1855, iv. 201.

** Canstatt's Jahresbericht, 1852.

†† Heim, op. infra citat. In these epidemics there were reported 57 cases of persons suffering small-pox for a second time; and of the 57, there were 16 fatal. In the Wirtemberg epidemics afterwards referred to, there were reported 86 cases of secondary small-pox, among which 12 were fatal.

‡‡ Seaton, on the Protective Value of Vaccination. Dr. Seaton quotes 203 cases of secondary small-pox, as reported to the Epidemiological Society. Of these 17 were fatal. In Mr. Marson's paper relating to the London Small-pox Hospital there are mentioned 47 cases of secondary small-pox. Of these 8 died from the disease, and 1 from an accidental complication.

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* It will be observed in the table that the fatality of small-pox, as it occurred in unprotected persons, ranged from under 15 (Carinthia) to 60 (Philadelphia) per cent.: while in persons who contracted the disease after previous vaccination

are seen in mass, it is merely noticed that, among a number of persons suffering small-pox, those who have previously been vaccinated incur much less risk than others. But when such a mass is dissected, there comes out as a second fact, that this lesser risk of the vaccinated has a graduated scale of its own; and that, *among vaccinated persons infected with small-pox, the danger of the disease is chiefly determined by the badness and insufficiency of their vaccination.*

Mr. Marson's observations.

The establishment of this truth is the work of Mr. Marson, who for more than twenty years has been Resident Surgeon of the London Small-pox Hospital, and who founds his conclusion on many thousands of cases, which during this time he has attended, and of which he has kept accurate notes.* Conceiving it to be, for practical purposes, a discovery of high importance, I annex a copy (App. F.) of the original paper, in which Mr. Marson, four years ago, communicated it to the Royal Medical and Chirurgical Society of London; and likewise (App. G.) a copy of the petition, last year addressed by Mr. Marson to the House of Commons, in which he briefly states the result of his large and laborious experience in small-pox and vaccination.

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its fatality ranged from an inappreciable smallness to 11 (Lower Austria) and even $13\frac{5}{11}$ (Vienna Hospital) per cent. This extensive range in each column depends on various circumstances. Sometimes, no doubt, material differences of classification have been made, one observer having included while another has excluded cases of *true chicken-pox;* sometimes (where the observation is that of hospital practice) only the graver cases of small-pox have been admitted for treatment; sometimes, a particular epidemic has been in its form milder or more severe; sometimes (as the reporter mentions of 15 out of the 25 deaths in the Vienna Hospital in 1834) cases are included in which the fatal issue was not due to small-pox. But, generally speaking, such circumstances would affect equally both enumerations (vaccinated and unvaccinated) in any one epidemic, and would certainly give no fallacious result in favour of the former. And in comparing together the enumerations of *any one epidemic*, it will be noticed that always there is a marked difference in favour of the vaccinated class; so that they, if infected with small-pox, have not, even in extreme cases (Lower Austria or Dalmatia), incurred half the risk of non-vaccinated patients. In many lines of the above statistical table, true chicken-pox is no doubt often reckoned as small-pox. In the returns of the London Small-pox Hospital a distinction is drawn between it and the *varicelloid modification of small-pox:* the former is excluded, and the latter (almost entirely occurring in vaccinated persons) is retained. This plan probably gives the most correct means of comparison. From the line which relates to the Vienna Hospital in 1834, there are excluded 533 cases of so-called chicken-pox; and judging by the high death-rate which results for the vaccinated persons, I should suppose that "varicella" had there been allowed to include many cases which in England would have been grouped as "varicelloid modifications"—*i. e.* vaccinal mitigations—of small-pox. For the reverse reason, the Vienna experience of 1837–56 gives rates lower than they would have reckoned here; for the total number of cases (6,213) includes 3,415 of so-called varicella; and of these, no doubt, a certain proportion would in England have been excluded as cases—not of vaccinal modification, but—of true chicken-pox.

* Dr. Kinnis, formerly Superintendent of Vaccination at Colombo, in his "Report on Small-pox as it appeared at Ceylon in 1833–4," and in an Appendix relating to observations made by Dr. Forbes in the epidemic of 1830, gives enumerations from which the annexed table is compiled. It will be observed, that the gradation of death-rates, marked in the last column, though far less detailed than in Mr. Marson's statement, is to the same general effect. And in the cases noticed by Dr. Kinnis himself the difference is further developed; for he distinguished persons pretending to have been vaccinated into such as had *no marks* and such as had *unsatisfactory marks* of vaccination, and found that the death-rate of the latter was $26\frac{1}{3}$, that of the former $32\frac{1}{7}$. Cases of chicken-pox are not included in the annexed table; and Dr. Kinnis gives at length (pp. 10–14) his reasons for concluding "that the febrile eruptive disease known in Ceylon by the name of chicken-pox, arises from an infectious matter, essentially different from that which produces small and modified small-pox."—Op. cit. Colombo Govt. Press, 1835.

OCCURRENCE AND FATALITY OF SMALL-POX.

—	Number of Cases.	Number of Deaths.	Percentage of Deaths.
(1) In persons decidedly not vaccinated - -	351	146	$41\frac{1}{2}$
(2) In persons having no marks, or but unsatisfactory marks of vaccination - -	199	52	$26\frac{1}{10}$
(3) In persons having satisfactory marks of vaccination - -	187	3	$1\frac{3}{5}$
(4) In persons having marks of small-pox	4	2	—

His conclusions, so far as they relate to my present point, are as follows:—That the fatality of small-pox, when it attacks the unvaccinated, is 350 per thousand; that its fatality to such vaccinated persons as it infects is, taking them indiscriminately, 70 per thousand; but, distinguishing vaccinated persons into two classes,—those (1) who have been vaccinated in the best known manner, and those (2) who have been badly vaccinated,—the fatality of small-pox, if it infects the former, will be 5 per thousand; if it infects the latter, 150 per thousand: that the risk of the one will be thirty times the risk of the other.

Almost perfect security given by good vaccination.

Such being the *almost perfect security* which well-performed infantine vaccination confers against death by small-pox, it remains to be considered whether here is the necessary limit of Jenner's benefaction to mankind. The remnant of danger is not great. But, such as it is, can it be prevented?

Further inquiry into post-vaccinal small-pox.

Two supposed causes of its occurrence.

Thirty years ago, when first it became notorious that small-pox might affect a certain proportion of persons previously and properly vaccinated, this partial failure of protection was explained on one or other of two suppositions:—Either (it was said) the vaccine contagion,* in its transmission through so many human subjects, must have lost by degeneration some of that specific protective influence which, in its former condition, it exerted on the human economy; or else there must be essentially something of uncertain constancy, something impermanent or liable to be impermanent, in the privileges which vaccination confers.

To the former of these possibilities I shall presently revert, and will now only remark, that, viewed as an alternative to the other, it was judged to be an insufficient explanation.

Lapse of time as a cause.

For what chiefly attracted attention was this: not that persons vaccinated by the surgeons of 1820–30 with the lymph of 1820–30 were less protected against small-pox than persons who had been vaccinated in 1798; but, generally, that persons who had been vaccinated ten or fifteen or twenty years, and who, during this interval, had perhaps repeatedly resisted small-pox, would at length, in a certain proportion of their number, yield to the infection. This had most frequently happened during times when small-pox was severely epidemic among the unvaccinated; and the first notice of the fact on a large scale in Scotland in 1818–20 merely meant that then, for the first time, *large masses of persons with vaccination of many years standing* were exposed to the test of a strong epidemic influence. Under this ordeal it had become evident that, for some vaccinated persons, the insusceptibility conferred by cow-pox was not of life-long duration. And from careful analysis of cases it was shown, that this lesser protectedness of certain vaccinated persons bore at least *some* proportion to the number of years which in each case had elapsed since vaccination. Some proportion, I say:—for (1st) there were not materials to prove any uniform rate of increase from year to year; and, (2d) the increase, such as it was, apparently continued up to about thirty years of age; after which period it seemed that, in the class of persons now under consideration, the liability to contract small-pox underwent a continuous decline. Thus (to select an illustration from a work to which I shall presently make more particular reference) Professor Heim, taking 1,055 cases of modified or unmodified small-pox in vaccinated persons, distinguished them under thirty-five heads corresponding severally to the number of years—from 1 to 35—which had elapsed since vaccination.* The thirty-five numbers corresponding to the thirty-five successive years are severally as follows:—15, 4, 4, 7, 10, 9, 12, 16, 17, 14, 14, 21;—44, 45, 62, 48, 59, 43, 57, 68, 44, 40, 50, 53, 52, 46, 41, 27, 41;—17, 16, 13, 6, 32, 8. It is true that, taken year by year, this series is irregular, as might be expected in so limited an experience; but when it is divided into three successive parts—one for *the first twelve* years after vaccination, one for *the next seventeen*, and one for *the following six* years,—it appears that the average number of cases for each year is, in the first division 12, in the second division 48, in the third division 15. Or if the series be divided into seven successive parts—one for each quinquenniad comprised in it—the seven quinquennial sums read thus:—40, 68, 186, 275, 239, 172, 75; and a corresponding subdivision of 653 cases which occurred at Copenhagen (according to Möhl, as quoted by Gregory) gives the series 14, 102, 173, 187, 156, 19, 2. A calculation of similar materials made by Professor Retzius (Gaz. Méd. de Paris, 1843), with respect to 961 cases in the Stockholm Hospital, gave the following series to express the average allotment of small-pox to each year of life in eleven successive quinquenniads up to the age of fifty-five:—3⅕, 4⅖, 13⅕, 45⅖, 51⅗, 40, 20, 17⅗, 3⅕, 2⅕, 1. Mr. Marson's copious information (App. F. pp. 19—21) tends to show the same thing.

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* I avoid speaking of the vaccine *lymph*, as being weakened by transmission through many human subjects, because this expression often represents a misunderstanding of what really occurs in the propagation of disease by morbid poisons. Lively arguments for the *necessary degeneration of the vaccine contagion* have proceeded on a belief that the original cow-pox at each vaccination *simply dilutes itself with certain passive juices* of the vaccinated body, that it thus of course gets weaker and weaker at every stage, till at its thirty-fifth succession it is reduced—according to Dr. Nicolai—to at least the 8,809,458,688th fraction of its original power. This argument founds itself on a radical misapprehension of the infective process in question. What essentially marks the infective action of cow-pox, small-pox, and similar morbid poisons, is, that under their *fermentative influence* some ingredient of the infected body converts itself into their likeness. The material contained within certain vaccine vesicles is not a something which has been transfused into the body, but a something which has been generated within it by a specific decomposition of its own proper substance; and the original lymph, which acted as a ferment to this process, has very probably completed its decay and altogether passed from the scene before those new vesicles begin to show themselves. Successive dynamical infections do not imply a perpetuation (with corresponding infinitesimal subdivision) of the original efficient; or Nicolai's argument might equally have been used to prove that the power of human procreation could not but cease soon after the days of Adam.

Post-vaccinal small-pox made manifest by signs of artificial interference in the present distribution of small-pox deaths, as contrasted with their natural distribution before the discovery of vaccination.

This re-development of susceptibility to small-pox, as affecting a certain proportion of the vaccinated population, is a fact which becomes most evident when one compares the present ages of small-pox death with the ages of small-pox death before the discovery of vaccination. Formerly, the entire number of such deaths, distributed among the ages of life, constituted, from first to last, a declining series. Duvillard gives an analysis of the 6,792 small-pox deaths which happened during nearly two centuries (1580–1760) in the city of Geneva; and the numbers belonging to the six successive quinquenniads of life up to the age of thirty were 5,467, 1,058, 126, 54, 39, and 31; only 17 cases having fallen to all ages above thirty. In the adjoining table the difference between that former distribution and the distribution which now prevails in partially vaccinated populations is shown. The 6,792 small-pox deaths of Geneva during the period 1580–1760, and 12,941 registered small-pox deaths of England during the years 1839 and 1847, and 3,699 registered small-pox deaths of London during the years 1848-51, and 3,323 deaths reported by the Epidemiological Society to have occurred in Paris during the years 1842–51, are severally analyzed according to the ages at which they took place. For convenience of comparison they are all reduced to the scale of

See Diagram appended. ☞

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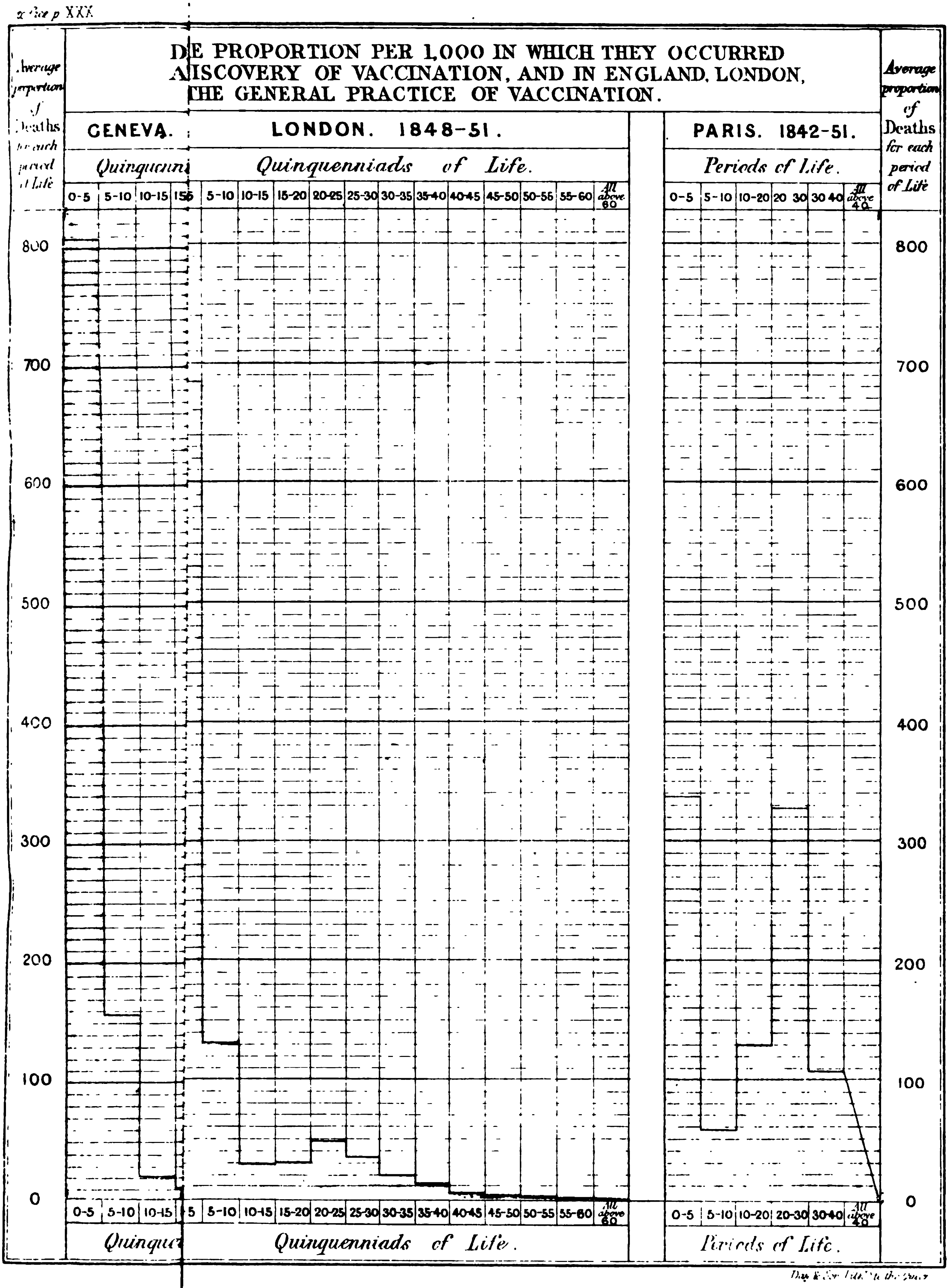
* In a medical pamphlet of thirty-five years ago (Address to Parents and Guardians on the Present State of Vaccination, by a Candid Observer; London, 1822; p. 47) I read, "There are strong grounds for believing that "this peculiarity of constitution, which disposes to attacks of modified or vaccine small-pox, is hereditary." A medical friend writes to me, that he and his two brothers were vaccinated in infancy to the satisfaction of their then doctor, that some years subsequently, when they were severally aged 13, 11, and 7, the second of them contracted small-pox in a very severe form, and the other two caught the disease from him; that my correspondent himself, when 20 years of age, having occasion to attend the post-mortem examination of a patient who had died of small-pox, again contracted the disease, and in his turn communicated a second infection to both his brothers, who, like himself, had suffered it before. Dr. Arnott tells me, that he attended in Spain a case of post-vaccinal confluent small-pox, where the patient's father had had small-pox twice, and her uncle three times, another uncle having died with a first attack of the disease. I have notes of an instance—published, I believe, by Dr. Webster—where three brothers and sisters had had post-vaccinal small-pox; one of them once; another twice; and the other three times, including a last and fatal attack.

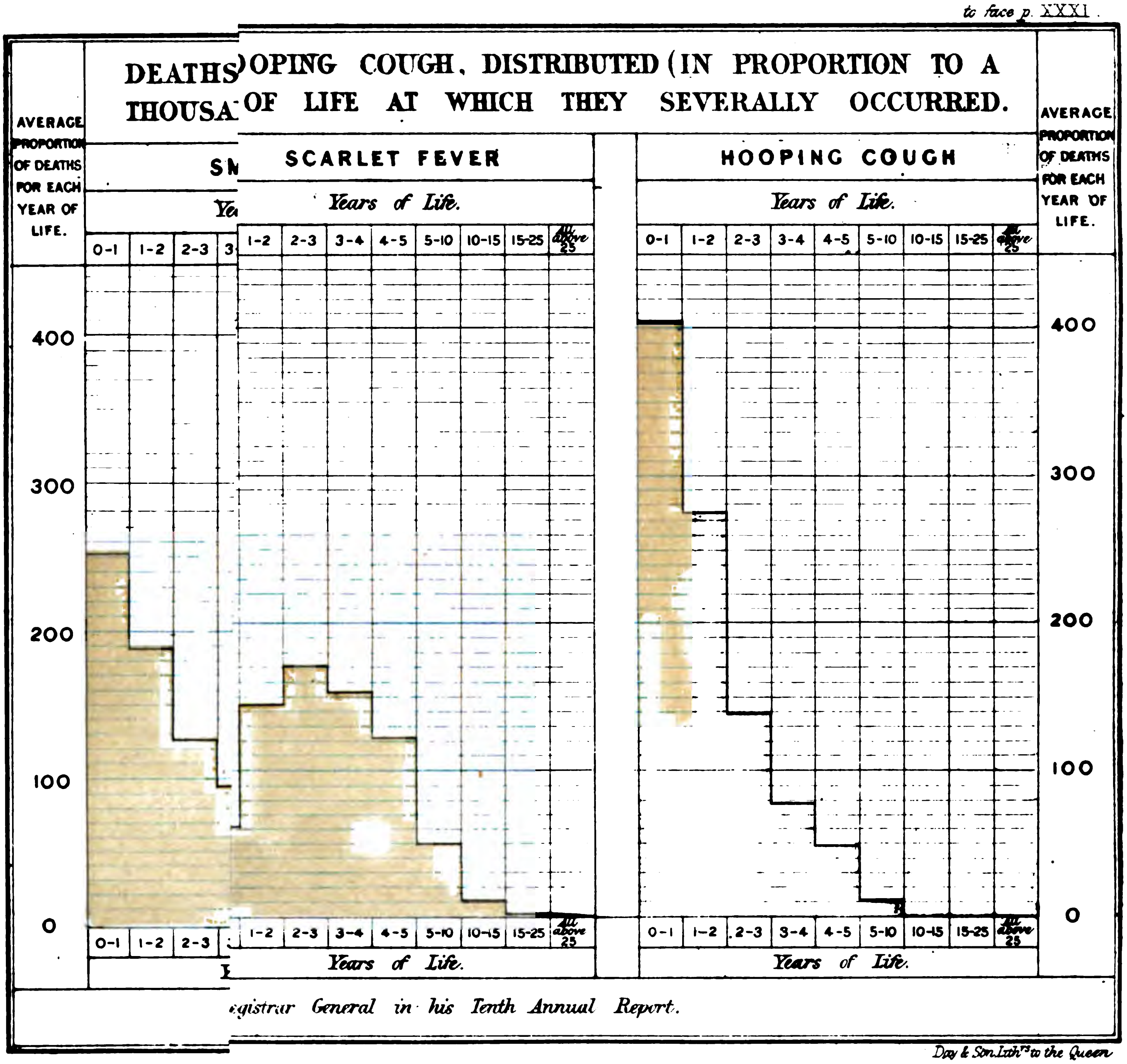
x See p XXX

DE PROPORTION PER 1,000 IN WHICH THEY OCCURRED
AISCOVERY OF VACCINATION, AND IN ENGLAND, LONDON,
THE GENERAL PRACTICE OF VACCINATION.



Day & Son Lith^rs to the Queen

to face p. XXXI.



Day & Son Lithrs to the Queen

1,000, and are reckoned for each age in reference to this total. In the column which relates to Geneva, the declining series from 805 to 2½ expresses what may probably be considered to have been the *natural* distribution of small-pox deaths among different ages in cities where it was frequently or constantly present. In its general signification, this declining series closely resembles the present distribution of those infectious infantile diseases (measles, hooping cough and scarlet fever) for which hitherto no prevention has been found, and which therefore in their distribution express unmodified natural affinities.* In those columns of the table which relate to London and Paris the declining series is interrupted; in the latter case most

Proportionate Distribution by Age of 1,000 Small-pox Deaths in Geneva before the Discovery of Vaccination, and of the same Number in England, London, and Paris respectively, at Periods subsequent to its general Practice.

Ages.	Geneva, 1580–1760.	England, 1839 and 1847.	London, 1848–51.	Paris, 1842–51.
0–5	805	739¼	684	338
5–10	155¾	127½	131	59
10–15	18½	24½	29½	132¾
15–20	8	25¼	30	
20–25	5¾	30¼	48	329½
25–30	4½	18½	35	
30–35	2½	11½	19¾	109½
35–40		7¾	12	
Over 40		15¼	10½	31½
Total -	1,000	999¾	999¾	1,000¼

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* The adjoining table expresses in four series of figures, arranged side by side, what may be considered, approximately at least, as the expression of those natural affinities of disease. The population under five years of age is of course always a minority of the entire population—in England at the last census somewhere about 13 per cent.; but that minority furnishes the large majority of the deaths here referred to. Two thirds of all deaths by scarlet fever, four fifths of all deaths by natural small-pox, a still larger proportion of all deaths by measles, and 943 of every 1,000 deaths by hooping cough belong to that fraction of the population. In a word, those are distinctively infantile diseases. And the obviousness of this fact represents three conditions:—First, that the susceptibility to those diseases developes itself very early in life; secondly, that the susceptibility, when once acted on by its corresponding exterior cause, becomes exhausted more or less absolutely for the remainder of life; thirdly, that the exterior cause or infection has been of sufficiently frequent recurrence among the population for those relations of susceptibility to show themselves. For the meaning of the diseases being infantile is, not that any insusceptibility to contract them is acquired in the mere act of growing up; but that—because the susceptibility developes itself at the commencement of life, and because the exterior influence which acts upon that susceptibility is seldom absent,—therefore all who have outlived the first years of childhood have commonly had each susceptibility exhausted by suffering the disease to which it relates. Hence, if all occurring cases of any such disease be classified according to the ages at which they happen, the resulting series of figures must necessarily have its maximum at that age where the special susceptibility is first fully developed. From this point it must undergo a more or less rapid and uninterrupted decline; the *uninterruptedness* being determined by the fact that at each succeeding age there will be fewer and fewer susceptible persons, the *rapidity* being graduated by the frequency or constancy with which the exterior cause is in operation. The infection of measles was carried to the Faroe islands in the year 1846 after an absence of sixty-five years; and it was then observed that (with exception of persons who had been touched in the former epidemic) nearly the whole population suffered. According to the very interesting history published by Dr. Panum (Virchow's Archiv. i. 492) there were—among 7,782 inhabitants of the islands—more than 6,000 attacks of measles. If these had been classified in the manner of which I speak, the maximum number corresponding to the age when the susceptibility is first fully developed, would probably have stood, as in the adjoining death-table, at the second year of life; but as all subsequent ages of that population up to sixty-five years represented a still susceptible class, the series of figures for these periods of life would have declined very slowly; probably, indeed, only at the same rate as the mass of living population declines from age to age. In the adjoining table, it deserves notice that deaths from hooping cough, and (in a trifling degree) those from small-pox, are proportionally most abundant in the first year of life; deaths from measles in the second; and deaths

Proportionate Distribution by Age of 1,000 Deaths in Geneva by Small-pox before the Discovery of Vaccination; and of the same Number of Deaths in England by Hooping Cough, Measles, and Scarlet Fever respectively, in the Year 1847.

Ages.	Small-pox.	Hooping Cough.	Measles.	Scarlet Fever.
0—1 - -	202½	404½	156½	63½
1—2 - -	191½	275	340¾	145
2—3 - -	190	138½	201½	171¼
3—4 - -	132¼	77¾	117	153
4—5 - -	88¾	47¼	68	123¼
0—5 - -	805	943	883¾	656
5—10 -	155¾	52½	91¾	254½
10—15 -	18½	2¼	13½	54¼
15—25 -	13¾	¼	4	12¾
Above 25 -	7	1½	7	22½
At all ages -	1,000	1,000	1,000	1,000

☞ See Diagram appended.

remarkably.* This interruption is certainly artificial; and no doubt chiefly denotes the mortality of post-vaccinal small-pox. In other words, vaccination has established an interference with the natural series: at a certain period this artificial interference is to some extent withdrawn, and the death-list begins to contain cases which formerly would have belonged to early periods of life: cases, where vaccination has only sufficed to postpone the fatal infection.

I refrain from inserting in the text of this letter any discussion of the very interesting pathological considerations by which those new facts in the science of vaccination may to some extent be interpreted.

Re-vaccination proposed as the preventative of post-vaccinal small-pox.

You will chiefly care to notice their practical result; namely, that men soon began to inquire, and by experiment to test, whether that absolute immunity against small-pox, which a vaccinated person in the lapse of years had partially lost, could by a second vaccination be renewed to him. And again, without dwelling on an immense detail of literature which records the tentative re-vaccinations of private practitioners (among whom Dr. Harder, of St. Petersburg, deserves especial credit), it is enough to study what has been observed in the re-vaccination of great masses of men in various military establishments, especially of Germany.

Extensive trial in Wirtemberg.

The earliest large experience of this kind came from Wirtemberg. In 1829 the practice of re-vaccinating the troops of that kingdom was commenced; and its collective results for the next few years are recorded in an elaborate form† by Professor Heim, of the Wirtemberg military service.

The adjoining table presents an abstract of these results in relation to five years terminating with June 1836. There are parts of it from which (because of the compli-

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from scarlet fever in the third. I have no reason to believe that a similar classification of *attacks* of those diseases respectively would (if one could obtain it) differ so materially from that classification of *deaths* as to reverse any important conclusion which may be drawn from the latter; and if not, there would seem to be evidence that the several specific susceptibilities to those respective diseases develope themselves, not simultaneously, but in succession. I would not insist much on the trifling difference between 202½, 191½, and 190 in the small-pox column; for although they show that the susceptibility to small-pox is largely developed in the first year of life, yet they leave it quite possible that the full susceptibility—if it could be tested by *attacks* instead of *deaths*—might be found rather in the second and third years of life than in the first. But the very early development of full susceptibility to hooping-cough, and the later development of susceptibility to scarlet fever, are strikingly illustrated in the table. It deserves notice, however, that an analysis of deaths from the same diseases in *London* during the seven years 1848–54, though showing generally the same distribution among different ages, presents a remarkable exception in the case of hooping-cough; the deaths from this disease in the first biennium of life being divided nearly equally between the two years; not, as above, in the proportion of 404½ to 275, but (with a slight preponderance for the second year) in the proportion of 319¼ to 323½.

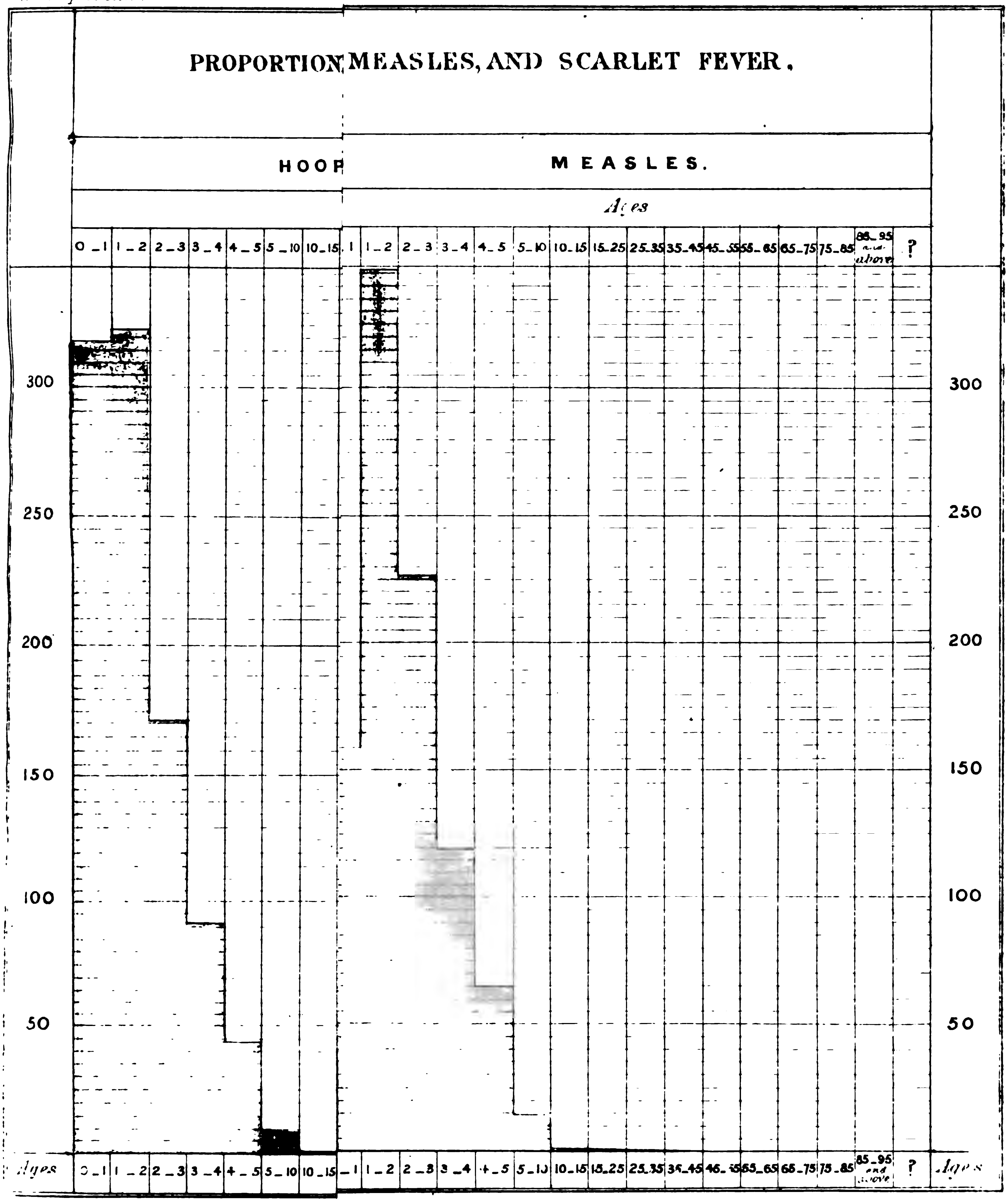
See Diagram appended. ☞

* That nearly one third of the whole number of small-pox deaths in Paris happens between the ages of 20 and 30 is one of the most startling facts I have learnt in my study of the subject. I can conceive for it no other explanation than that given in the text, and, if this be the true one, there must prevail in Paris an appalling amount of post-vaccinal small-pox. I cannot say whether difference of race may make any difference to that re-developement of susceptibility to small-pox; still less can I venture to surmise whether so extreme an instability in the results of French vaccination may depend on anything peculiar to the French administration of this important agency. But if those indications be sound, which in a later part of this section I deduce from the history of re-vaccination in the Prussian army, there would apparently be cogent reasons for inquiring very critically into the *quality of lymph* which is current for the vaccinations of France.

† Historisch-Kritische Darstellung der Pocken Seuchen, etc., im Königreiche Württemberg, innerhalb der fünf Jahre Juli 1831 bis Juni 1836. Professor Heim also reports (though with less exactness) the results of 29,864 re-vaccinations performed by civil practitioners in different parts of Wirtemberg, and the general results were as in the annexed form.

Ratio of Success per 1,000 Cases Re-vaccinated.		
Perfect Success.	Modified Success.	No Success.
517·7	176·2	306·1

to face p. XXXII.



PROPORTION, MEASLES, AND SCARLET FEVER.

catedness of the conditions) I will not venture on attempting to draw conclusions. But there are other parts of which the meaning is obvious.

—	Total.	Ratio of Success per 1,000 Cases Vaccinated.		
		Perfect Success.	Modified Success.	No Success.
Vaccination of the Wirtemberg Army in the five years 1831½-5½ -	14,384	340·2	260·8	411·5

13,681 of the above-mentioned 14,384 military vaccinations being classified according to the marks of previous vaccination or small-pox, the results were as under :—

Degree of Success of Re-vaccination.	Of Cases with Normal Cicatrices of Vaccination there were 7,845, and among these the results per 1,000 were,	Of Cases with Defective Cicatrices of Vaccination there were 3,545, and among these the results per 1,000 were,	Of Cases with no Cicatrices of Vaccination or Small-pox there were 2,025, and among these the results per 1,000 were,	Of Cases bearing marks of previous Small-pox there were 266, and among these the results as per 1,000 were,
Perfect -	310·4	280·7	337·3	319·5
Modified -	280·5	259	191·1	248·1
None -	409·2	460·4	471·6	432·3

11,565 of the same number being distributed according to age, the results were as under :—

Degree of Success of Re-vaccination.	Under 20 Years of Age there were Re-vaccinated 124 persons, and the results as per 1,000 were,	Between 20 and 30 there were Re-vaccinated 11,157 persons, and the results per 1.000 were,	Above 30 Years of Age there were Re-vaccinated 284 persons, and the results as per 1,000 were,
Perfect - -	338·7	285·6	426·1
Modified -	322·6	259·2	207·7
None - -	338·7	455·2	366·2

" Modified" results of re-vaccinations.

First, let me observe that one line of the figures corroborates, in an indirect manner, the conclusions recently quoted from Mr. Marson. Besides 5,919 of the vaccinated on whom the operation produced no vacciniform result, there were 3,751 (or about 260 per 1,000) in whom it produced results approaching, but not quite attaining, what was strictly enforced as the criterion* of perfect success. These " modified successes" form for comparison a group, less subject to accidental sources of fallacy than some other combinations in the table; and such *modification* is in its way (like an attack of small-pox) a measure of how far the influence of previous protection survives in those persons in whom it has begun to decline. Now, in tracing the degrees of this influence as present in the four different categories of vaccinated persons, and as expressed in proportions of those classes, it is seen that the proportion is highest (280½) in those who showed normal marks of previous efficient vaccination; next (259) in those whose previous vaccination marks, though visible, were imperfect; next (248) in those who had had small-pox; and least (191) in those who, whether they had previously had small-pox, or been vaccinated or not, showed no scars of either infection.

More than a third of the whole perfectly susceptible of re-vaccination.

But the table shows, even more unquestionably, another great fact. It shows that on the average of more than 14,000 experiments (an immense majority performed at between 20 and 30 years of age) 34 out of every 100 re-vaccinated persons developed the same sort of vesicle as would arise from a first insertion of vaccine lymph. And it is important to observe, that this renewed susceptibility to cow-pox did evidently not depend, so far as could be traced, on any original ineffectiveness of the former vaccination; for (as is expressly set forth in the second part of the table) among the 14,384 subjects of vaccination there were 7,845 who presented strictly normal scars of previous vaccination; yet nearly a third of this large number gave again exactly such local phenomena as arise in children when vaccinated for the first time.

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* Heim, op. citat, p. 594. Beim K. Militär wurde jede nicht mit dem reinsten Bilde einer vollkommenen Kuhpocke, oder mit zu grosser Randröthe und dem Anschwellen des Oberarmes verbundene Impfung unter den modificirten Erfolg locirt; wohin alle übrigen pustulösen Abnormitäten des Exanthemes gerechnet wurden, die manchen Impfchirurgen verleitet haben könnten, sein "guter Erfolg" auszusprechen. Als erfolglos wurde jeder nicht bis zur Blasenbilding gesteigerte Lokalprozess, und das was man falsche Kuhpocken zu nennen pflegt, aufgerechnet. Nur das ungetrübte Abbild der bei erstmals geimpften Kindern für gut erklärten Schutzpocke wurde auch an den Revaccinirten "gut" prädicirt.

What inference may be drawn from this?

Is it then a legitimate inference from these figures, that, if the same 14,384 soldiers had been exposed to an atmosphere of small-pox infection, every third man would have caught the disease? Certainly not. Inoculation of lymph (whether vaccine or variolous) is, so to speak, a finer and more delicate test of susceptibility to the small-pox poison than is the breathing of an infected atmosphere; so that many persons, when the lymph of cow-pox or small-pox is inserted in their skin, will give—locally at least—evidences of susceptibility which no atmospheric infection would have elicited from them. And of this, perhaps, there can be no more ready illustration than by noticing (either in another part of the annexed table, or on a still larger scale in a subsequent table, which represents the re-vaccinations at Kasan) that persons who bore marks of previous small-pox were, in at least equal proportion with previously vaccinated persons, capable of producing perfect vaccine vesicles: and probably they too, if tested with variolous matter, would have shown at the inoculated part similar signs of susceptibility; whereas, notoriously, of persons who have once had small-pox, not nearly one third becomes afterwards capable of contracting small-pox by frequenting the neighbourhood of the sick.

For this reason (greatly corroborated by what had already in every-day practice been observed of the immunity of once-vaccinated persons) it was evidently impossible to argue that *all* who on re-vaccination yielded perfect vaccine vesicles would, on ordinary exposure to small-pox infection, have become infected with small-pox. On the other hand, there could be little reason to doubt that they would have been distinctively *the endangered class*:—not that all or nearly all of them would have suffered; but that from among them— more than from among other vaccinated persons—the occasional sufferers by small-pox would have come.

The experience of other countries did not fail, so far as it went, to confirm the general accuracy of the Wirtemberg observations.

Prussian re-vaccinations.

Especially in the Prussian army, in 1833—at the commencement of a system to which I shall presently revert as having given other remarkable results—there were re-vaccinated between forty and fifty thousand adults, and in about 33 per cent. of the entire number this re-vaccination took with perfect success.

Russia.

In a re-vaccination of Russian soldiers at Kasan,* Dr. Thiele observed that in 28 of each hundred cases the operation succeeded perfectly or imperfectly; that the rate of perfect success was 18$\frac{3}{5}$ per cent.; and (as there happened to be vaccinated at the same time 1,436 persons presenting marks of previous small-pox) that perfect vaccine vesicles would arise just as often on persons who had once had small-pox as on persons who had once been vaccinated.

Denmark.

Of nearly 24,000 re-vaccinations practised in the Danish army† in the four years 1843-5 and 1847, more than half were attended with perfect success, and more than a quarter with modified success. There

RESULTS of 1796 ADULT VACCINATIONS at KASAN.

In Subjects as follows:—		Perfect Success per 100 Cases.	Imperfect Success per 100 Cases.
Presenting marks of previous small-pox	1,436	18$\frac{7}{8}$	5$\frac{4}{7}$
Presenting marks of previous vaccination	247	18$\frac{3}{8}$	9$\frac{3}{4}$
Presenting neither -	112	29$\frac{6}{12}$	16$\frac{1}{12}$

RESULTS of DANISH RE-VACCINATIONS.

Perfect Success - - - - - -	12,041
Modified Success - - - - - -	6,131
Perfect or modified Success obtained at a second trial	1 532
Complete Failures - - - - - -	4,241
Total - - -	23,945

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* Henke's Zeitschr., 1839.

† Oppenheim's Zeitschrift, vol. 27.

remained between a fifth and a sixth, on whom (though most were submitted to a second trial) no impression could be produced.

Brunswick.

Of 1,050 re-vaccinations, practised in the Brunswick army* in 1844, 502 gave the perfect and 130 the modified result.

Baden.

In 1844 there were practised, in the army of Baden,† 20,483 vaccinations, and the results stated in per-centages were as follows:—perfect success, 38·6; modified success, 26·6; failure, 34·7. In a less extensive re-vaccination (3,170 cases), which had taken place four years earlier, the perfect successes had been at the rate of 26⅓ per cent., and the modified successes at the rate of 38⅓. The proportion of perfect successes was also 27 per cent. in 2,355 re-vaccinations which took place in Baden in 1842.

Effects of re-vaccination against post-vaccinal small-pox.

By the earliest of these various independent observations it was put beyond question, that the same lapse of time, which renders some vaccinated persons again susceptible of small-pox, renders them also again susceptible of cow-pox. But it remained to be seen whether that second dose of the latter infection, which it was the object of re-vaccination to introduce, would restore such persons, either permanently or for a long while, to the state of security from which they had declined; whether, by successful re-vaccination, their revived susceptibility to small-pox would once more be extinguished.

Nearly thirty years have elapsed since the commencement of this practice on a large scale, and it may now fairly be judged by its fruits.

In Wirtemberg.

As early as 1838 Professor Heim reported its results in Wirtemberg to the following effect:—That during the five years 1833–7, though small-pox infection had been sixteen times imported into different regiments of the army, there had ensued among the 14,384 re-vaccinated soldiers only—in the person of one whose re-vaccination two years before had been followed by "modified" success—a single instance of varioloid. And, similarly, in the civil practice of the kingdom during the same time, among nearly 30,000 re-vaccinated persons, there had occurred only (1) a mild case of varioloid in a woman who four years before had been re-vaccinated apparently with "modified" success, and (2) a case so trifling that it was called chicken-pox in a man who, fifteen years before, at the age of 13, had been, if not re-vaccinated, at least successfully vaccinated. Yet, within these five years, the infection had been present in 344 localities of Wirtemberg; producing 1674 cases of true or modified small-pox among the not re-vaccinated and in part not vaccinated population of 363,298 persons, in those places where it had prevailed.‡

In Prussia.

Better, because longer and larger, experience of the same kind is that of the Prussian army, as recorded year after year, by Dr. Lohmeyer, in the successive volumes of the *Berliner Medizinische Zeitung*, from 1833 to the present time. In Prussia (just as in Wirtemberg) the practice of re-vaccination grew out of the knowledge that small-pox would ultimately attack a certain proportion of those who had been vaccinated only in infancy. This knowledge, too, had been dearly purchased in the Prussian army; for,

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* Oppenh. Zeitschr., vol. 27.

† Henke's Zeitschr., 1842.

‡ In these epidemics (as in all where small-pox has attacked a certain proportion of the vaccinated population) the mildness of the disease in such vaccinated persons, as compared with the unvaccinated, and even with those who had previously suffered small-pox, was constantly observed. The annexed table, compiled from Heim's material, illustrates the fact. Its chief results are inserted in the table at page xix.

It should be added, that, in Wirtemberg, great pains were taken, by isolation of the sick, to prevent any general spread of contagion.

Total of Variola and Varioloid.	Cases, 1,677	Deaths, 198
1. Bearing marks of vaccination, or said to have been vaccinated.	1,055	75
2. Unvaccinated - -	387	96
3. Having previously had small-pox.	57	16
4. Undetermined - -	178	11

during the ten years preceding 1831, cases of post-vaccinal small-pox were increasing in number and fatality; attacks were counted annually by many hundreds; and within the three years 1831-3 there had occurred no fewer than 312 deaths by small-pox. For the last twenty years the Prussian army has represented an almost entirely re-vaccinated population. And what has been the contrast? 104 annual deaths by small-pox was the last experience of the former system; 2 annual deaths by small-pox has been the average for the re-vaccinated army. Analysing moreover the 40 fatal cases of small-pox which, during the last 20 years, have occurred in the Prussian army, we find that only 4 of the number were of persons who (it is said) had been successfully re-vaccinated.

In Bavaria, Denmark, and Sweden.

Other illustrations of the same conclusive kind may be gathered from the experience of other countries. From 1843 re-vaccination has been compulsory in the Bavarian army; and from that date to the present time (we are told) neither a single death by small-pox, nor even a single case of unmodified small-pox, has occurred in that population.* For the last 21 years re-vaccination has been general in the Danish army, and for the last 13 years in the Danish navy; and these two populations (we are informed) have almost entirely escaped contagion during several epidemics of small pox.† The practice of Sweden has been similar, and its results also satisfactory.‡

Dependence of post-vaccinal small-pox on original incompleteness of vaccination.

The preceding pages have shown that a liability to post-vaccinal small-pox does, in considerable numbers of persons, tend to develop itself from about the period of puberty, and that against this danger re-vaccination gives the desired security. It remains to be considered, as an important practical question, whether that occasional tendency to lose the advantages of a first vaccination depends on such vaccination having itself been originally imperfect.

Mr. Marson's observations have shown that the *severity* of post-vaccinal small-pox is least where the local signs of vaccination are sufficient and satisfactory. Whether post-vaccinal small-pox be less *frequent* (as well as less dangerous) in the same ratio, is as yet not certainly known. But, while recognizing the affirmative to be in the highest degree probable, we must admit that small-pox—though commonly in its most modified degrees—does occur in some whose scars of vaccination are in every respect normal. So that, according to such experience as hitherto exists on the subject, it may be said that, by some change proper to the vaccinated body itself in the course of its development, the protective influence even of apparently perfect vaccination tends, more or less, with time to become weakened.

Does vaccination become less protective by a weakening of its contagion in successive transmissions?

But—now reverting at length to a doubt which I have already mentioned—is there any reason to believe that this occasional impermanence of protection has, directly or indirectly, depended on impairment in the specific power of vaccine contagion? an impairment become possible, since Jenner's first collection of facts? an impairment arising in the transmission of that contagion through many generations of men? On this difficult question contrary opinions have been expressed.

Opinion of Nat. Vaccine Establishment.

In a recent Annual Report (1854) of the National Vaccine Board the following paragraph occurs:—"We feel it our duty, in order to dispel any doubts which may still "affect the public mind, to repeat what we have so frequently stated with unabated confi-"dence, that the vaccine lymph does not lose any of its prophylactic power by a continued "transit through successive subjects, and that it is a fallacy to predicate the necessity of "resorting to the original source of the cow for a renewed supply." This opinion, advanced with the authority of an establishment which, for nearly fifty years, has been concerned, and of late almost wholly concerned, in the distribution of vaccine lymph, is entitled to very respectful consideration. It represents, probably, the convictions of the permanent officers of the Board, Dr. Hue and Mr. Tomkins, founded on their own observations and correspondence, and endorsed by the three ex-officio members of the Board, who, on occasion of this Report, were Dr. Paris, Mr. Luke, and Dr. Nairne.

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* App. p. 170.

† App. p. 171.

‡ App. p. 185.

Contrary Opinions.

The opinion, however, does not seem to be universally shared in other countries of Europe; and, even in England, it has been received with much hesitation by those unofficial persons who have given most labour and ability to the study of vaccination.

Some have argued that the vaccine contagion must naturally and inevitably become deteriorated in its successive human transmissions.* Perhaps, it is only as against this unqualified belief that the above quoted, equally unqualified, opinion, has many adherents.

Others believe such degeneration to be only a contingent danger.† But in a large concurrence of testimony it is recognized at least as a possibility which has very frequently been realized.

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* In support of this doctrine, reference has been made to what commonly occurs in the *clavélisation* of sheep. In order to procure a mitigation of ovine small-pox, recourse has been had to the same sort of proceeding as used to be followed on the human subject; and the contagion of the disease has been artificially conveyed from sheep to sheep by inoculation with *claveau* or lymph, derived in the first instance from an animal having the natural disease. Monsieur Hurtrel d'Arboval, in his Dictionary of Veterinary Medicine (vol. i. p. 445) gives the following account of what ensues:—"Il est une observation bien digne de remarque, c'est que le claveau perd de son activité et de sa "propriété par la succession de son inoculation. Vierdin a observé qu'à la cinquième clavélisation, il ne produit pas "qu'un bouton unique, et Boudouin fixe à la douzième ou quinzième clavélisation successive le dernier degré de "l'affaiblissement du claveau. Passé ce terme, on ne remarque plus de veritable clavelée, ou du moins on en voit très-"rarement. Il est donc nécessaire de renouveler de temps en temps le claveau, en le reprenant sur des bêtes atteints "naturellement de la clavélée." Mr. Ceely however (to whom I owe my knowledge of this remarkable passage) does not receive, without reserve, the alleged degeneration of small-pox contagion in the sheep. He expresses to Mr. Simonds (see the latter's work on Variol. Ovin., p. 123) his doubt whether it may not have arisen in the absence of "care and "selection in the transmission." But "if it be true, when great pains are taken to repeat inoculations with lymph in "a proper state, viz., clear and limpid, it is a very remarkable and highly interesting fact, and well worthy the "attention of the members of the medical and veterinary professions...... I cannot help suspecting that the "difficulty consists in obtaining the virus before it is too late, for there certainly is a difficulty."

† It is alleged, that, without any fault of the vaccinator, certain subjects act deterioratingly on the contagion which they transmit; that lymph taken from them is necessarily an inefficient lymph; that such subjects must occur in every line of succession; that thus at the end of any long series of vaccinations, effected from arm to arm *without selection of subject*, degeneration will certainly have been produced. Still more frequent danger to the efficiency of successive contagions arises of course in acts of personal carelessness, to which reference is hereafter made, especially in taking lymph from vesicles too advanced in their processes (when in fact it has degenerated), or from vesicles that have been disturbed in their course by mechanical or other irritation, or by accidentally concurrent diseases (especially skin diseases) in the subject. I cannot say to what extent the various modified stocks of contagion thus originated are capable of perpetuating their degenerative types: but whatever the extent may be, to that extent the results tend to diffuse themselves in proportion to the number of vaccinations. Whether slow progressive degeneration of the vaccine contagion in its successive human transmission be or be not proved—whether its renewal at stated intervals from the cow be or be not an unconditional necessity,—the practical conclusion evidently is, that its operation must in every case be intelligently watched; that no line of transmission is to be continued through a subject in whom imperfect infection is produced; that at any such point the vaccinator must stop; and that from all such points as they are arrived at re-application must be made to the parent stock—not necessarily at its source, but at least at some stage of descent in which its infective powers are unimpaired. Upon each individual vaccinator must rest the responsibility of providing in his own practice against those obvious chances of deterioration of supply. It becomes difficult or impossible to fulfil this obligation, except where the vaccinator carries on simultaneously a certain number of vaccinations; so that he may be able at any time to choose between several arms as sources for continuing his contagion, and may never be tempted to take lymph otherwise than from the typical Jennerian vesicle of a thoroughly healthy subject. It is on these grounds that persons who have given most attention to the scientific culture of vaccination (foremost among whom I am permitted to name Mr. Ceely and Mr. Marson) look with some alarm on our present minute subdivision of the duty of public vaccination, as tending to reduce many public vaccinators to an objectionable alternative; either that they must have frequent recourse to extrinsic assistance, or must incur the chance of the contagion degenerating by its transmission through unselected subjects. This danger would of course be greatly increased if (as has been suggested) the subdivision were carried further by arranging for public vaccination under a kind of general contract with the entire medical profession.

Facts alleged.

From so long as forty years back, definite allegations have been made, purporting to prove that the power of vaccine lymph, as derived from successive contagions of the human subject, had progressively diminished. For instance, M. Brisset,* as early as 1818, declared that the past ten years had made a very marked difference in the visible characters of the vaccine vesicle; adding, that, for protective purposes, it was now necessary to produce, instead of Jenner's two vesicles, eight or ten points of infection; and Dr. Meyer,† of Kreutzburg, not only made the important remark, that, on examining in 1824-5 nearly 4,000 vaccinated persons of all ages, he had found the older scars of vaccination much better marked than the recent ones, but also stated, on the authority of the district vaccinators, that the proportion of unsuccessful to successful vaccinations was every year growing larger; and further, happening at this time to obtain for his own vaccinations a regenerated supply of lymph, he was able to make the supplementary observation, that this almost invariably acted with effect, and that the resulting cicatrices were again after the old normal type. Other assertions to the same effect were not infrequent; but opportunities of verification were rare, and the most important investigations of the subject belong to the last twenty years.

Comparative experiments.

Successive comparative experiments by M. Bousquet,‡ Dr. Gregory,§ Mr. Estlin,|| Professor

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* Mem. de la Société de la Faculté de Médecine de Paris, 1818; and Réflexions sur la Vaccine et la Variole; Paris, 1828. E. g.:—"La manifestation et surtout la cessation des symptomes de la vaccine me paraissent notablement "abrégées; la marche de cette maladie est plus prompte. . . . La tumeur vaccinale (dont le développement est si "essentiel pour constater l'activité du virus vaccin et l'efficacité de la puissance préservatrice de la vaccine) est "infiniment moins proéminente, si même on peut dire qu'elle existe." . . . &c.—Réflex., p. 166.

Quoted by Steinbrenner, op. cit. 493.

‡ M. Bousquet (sur le Cow-pox découvert à Passy le 22 Mars 1836) gives an elaborate account, illustrated with coloured plates, of the differences of operation which he observed between the current lymph of 1836 and that of a new source. One important difference was in power of *taking*:—"Sur un nombre égal de vaccinés avec l'ancien et le "nouveau virus, le premier a donné 628 boutons et le second 776; différence 148, en faveur du dernier. Et "remarquez que je ne fais souvent que deux piqûres avec le nouveau vaccin, tandis que j'en fais toujours trois avec "l'ancien." This at p. 24; and, as regards some other differences, at p. 20—"On voit que le nouveau vaccin marche "tout à la fois plus vite et plus lentement que l'ancien; plus vite en ce qu'il donne plus tôt signe de vie; plus "lentement, en ce qu'il prolonge sa carrière beaucoup plus loin." M. Bousquet adds, that in vesicles produced by the new contagion, the lymph remained effective much later than in vesicles of the former source, and that the lymph was more effective for re-vaccination.

§ Dr. Gregory (Med. Gaz. xxi., p. 860) drawing a distinction in 1838, between two qualities of lymph, says, of that which he had abandoned, that—"For three or four years past he had noticed a diminution of its intensity; "eight or ten incisions produced not more irritation than the three to which I was accustomed fifteen years ago. In "March last, Mr. Marson, the Resident Surgeon, employed lymph from a different source. The new lymph was "found to be far more intense and active than the old lymph. . . These facts have convinced me that vaccine "lymph, by passing through the bodies of many persons, loses, in process of time, some essential portion of its "activity."

|| Mr. Estlin, in reference to one quality of lymph (Med. Gaz. xxii., p. 997) says—"The alterations in the "vaccine infection which have appeared to me most marked are the smallness of the vesicle and its attendant areola; "its rapid course; the absence of constitutional disturbance; the small quantity of lymph yielded by the vesicle; "and especially the diminished activity of its infecting power." And subsequently (Med. Gaz. xxiv. p. 153) in reference to a different supply, which he had recently derived from its source, he observes—"Having watched the virus "through 29 subjects successively (nearly one every week since the matter was derived from the cow), I have now "no hesitation in stating, that I consider it a valuable supply of virus, more energetic in its local and constitutional "effects, and more inclined to produce vesicles resembling what cow-pox was many years ago, than that employed by "the National Vaccine Establishment." Mr. Estlin soon after published (op. cit. p. 208) important testimony from the Vaccine Institution of Glasgow, stating that in 43 trials made with this lymph there had not been a single failure, whereas in the last preceding 43 vaccinations made with a former lymph there had been failure in 10 cases, and

Hering,[*] M. Fiard,[†] and Dr. Steinbrenner[‡] have established, I think, beyond the possibility of reasonable doubt, that certain original properties of the vaccine contagion have very generally declined, after its long successive descent from the cow. It may require separate discussion whether all of these properties are of primary importance to the purpose of vaccination: but the fact at least seems certain, that, when the first difficulties of converting the cow-pox into a human contagion have once been overcome, this newly-humanized contagion shows an amount of infective power which is not usual in lymph of long descent. The former *takes*, as the phrase is, in persons with whom the latter has failed; often, for instance, in re-vaccination. It excites local changes of an intenser kind; so active, indeed, as to render caution necessary in its use. The vesicle produced by it runs a full course; compared with which the progress of common vaccine vesicles seems unduly rapid and their termination premature. Also it renders more certain, and apparently more characteristic, that slight febrile disturbance which is proper to the action of cow-pox on the human system.

Importance of these facts in relation to the continuance of small-pox:

Now it is important to remember, that, in the comparative observations referred to, the lymph which has been stated more or less to have lost its original properties, has commonly been the current lymph of the country—the lymph of the public service. Those experiments, therefore, virtually say that millions of vaccinations have been performed with lymph not fully possessing its original endowments; and they make it at least very questionable, whether

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spurious or imperfect vesicles in 9 others; that at this Institution, in the course of the preceding 3½ years, there had "at four different periods occurred an entire degeneration of the lymph, and a consequent complete failure of the "vaccination;" and that, at the very time when the new supply reached them such a failure was being illustrated in the fact that "all the children vaccinated upon the day week preceding, presented, instead of true vesicles, raw surfaces "resembling spots that had been vesicated and then denuded of their cuticle."

[*] Professor Hering, of Stuttgart, (über Kuhpocken an Kühen, p. 166) writes—"Die von originärer Kuhpocken-"lymphe bei Kindern entstehenden Pusteln sind meist durch Grösse, stärkere locale Entzündung, heftigeres Fieber und "langsameren Verlauf ausgezeichnet. In selteneren Fällen kommt aber auch das Gegentheil vor. Die stärkere "Einwirkung auf den menschlichen Körper ist oft noch in der zweiten und dritten Impf-Generation bemerklich. Die "Impfung mit solch erneuertem Stoffe schlägt seltener fehl als mit dem seit langer Zeit nicht mehr aufgefrischten. Ein "frieselähnliches Exanthem begleitet manchmal die Impfung mit originärer Lymphe." In the little volume referred to there is an unusual amount of information on the subject; for, during the ten years 1827–37, genuine cow-pox had been observed in Wirtemberg on 69 different occasions; and its contagion had been successfully transferred to the human subject at least 170 times out of about 210 trials.

[†] M. Fiard, communicating to the Académie des Sciences in 1844 the results of an experimental comparison which he had just instituted between the action of lymph then newly derived from the cow and the action of other lymph which was of eight years' descent, uses these words:—"Jusq'au huitième jour (comme cela a lieu pour la "varioloïde et la variole) la différence est nulle; mais à dater du neuvième jour, la dessiccation des pustules de "l'ancien vaccin commence; elle est complète du treizième au quatorzième jour. Le nouveau, au contraire, poursuit "sa marche et son développement plus lentement, et la dessiccation n'est complète que du seizième au dix-septième "jour. C'est donc, entre ces deux vaccins, une différence de trois ou quatre jours. Le vaccin de Jenner, après un "séjour de trente-neuf ans sur l'homme, comparé en 1836 à celui de 1836, était tombé au point que sa dessiccation "avait lieu le douzième jour, tandis que celui de 1836, comme celui de 1844, n'arrivait à la dessiccation complète que "le dix-septième jour. Il y avait donc une différence de cinq jours. Celui de 1836, aujourd'hui, après huit ans de "séjour sur l'homme, comparé à celui de 1844, dont la dessiccation n'est complète que le dix-septième jour, arrive "à cette dessiccation du treizième au quatorzième jour; c'est donc trois ou quatre jours qu'il a perdu sous le rapport "de la durée éruptive. Or, d'après ce qui précède, il est évident que le vaccin de 1836, en huit ans, a subi aujourd'hui "une atténuation. Donc il faut le remplacer par le nouveau, puis se mettre en mesure pour opérer le renouvellement "tous les cinq ou six ans."—Comptes Rendus des Séances de l'Acad., 1844, p. 749.

[‡] Dr. Steinbrenner (op. cit. p. 252) in describing the results of his own comparative experiments, says—"On "pourrait presque dire que les pustules de vaccine ancienne sont aux pustules de vaccine régénérée ce que les pustules "de varioloide sont aux pustules de variole. En effet, comme dans la varioloide, les pustules du vaccin ancien sont "moins développées, se dessèchent plus rapidement, l'affection générale qui les accompagne est plus légère, elles "laissent des cicatrices bien moins profondes," &c.

an indefinite length of transmission of the vaccine contagion, without renewal from the cow, has not been of public detriment.

Namely (1) of infantine and other natural small-pox;

For, assuming only that vaccine lymph is generally more likely to produce its expected *immediate* results in proportion as it is of short pedigree, I think this difference not unimportant. Frequent failures in vaccinating not only disappoint and annoy both parties concerned, not only discredit the operation and the operator, but likewise too often lead to an ulterior evil. Ignorant persons look rather to the mere doing of vaccination than to its success; and it constantly happens that children who have been thus nominally vaccinated are in fact left with no further attempt to secure them against small-pox.

and (2) of post-vaccinal small-pox.

Likewise, looking to some other peculiarities which mark the action of vaccine lymph in its earlier generations, especially to that more prolonged course of the local eruption, and to that more decided febrility which attends it; symptoms, both of them, which seem to say that this infection grasps deeper and more largely into the system; I should very much hesitate to consider their occurrence indifferent to the ultimate issue of the operation.* Not venturing to speak otherwise than with sincere diffidence on what I deem one of the deepest problems in pathology, I must urge at least the *probability* that these symptoms may be the very signs and measures of that total bodily change which vaccination is intended to effect. If this be a true interpretation of their meaning, surely a vaccination which is deficient in such consequences must inspire less confidence than another. And from the observations I have quoted, it would then apparently result that, after long periods of human transmission, the contagion of cow-pox has proved unable to excite in the vaccinated body its *maximum* of protective change; that lymph of shorter descent has been more successful in disinfecting the body of that ingredient which constitutes its susceptibility to small-pox.

Statistical test.

Increasing re-susceptibility of small-pox in the vaccinated?

Is it, then, the case that an extensive use of degenerated lymph has determined that too frequent impermanence of protection against post-vaccinal small-pox? It is chiefly from national statistics that the answer must be sought; and the critical question to be asked in any country where the vaccine supply has seldom or never been renewed from the cow, is this:—Assuming that, from 1800 to 1840, every year's vaccination has included *a certain proportion* of infants who eventually (say 15–25 years afterwards) have become re-susceptible of small-pox *—has this proportion from year to year progressively increased?*

Increasing re-susceptibility of vaccination?

In respect of small-pox itself there are no facts, I believe, nearly sufficient in amount for even an approximative answer to this question;† but in respect of a closely kindred issue there are some materials of a very suggestive sort. For, if it should appear that the *proportionate re-susceptibility of vaccination at a given age* were undergoing a uniform progressive increase, this — like a uniform progressive increase of post-vaccinal small-pox—would make it almost certain that primary vaccination had progressively become less effective. And it is difficult to conceive how the infantine generations of a country could, crop by crop, successively derive less permanent constitutional impressions from vaccination, unless the efficient cause of those impressions—the vaccine contagion itself—had year by year undergone enfeeblement of its powers.

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* It is an interesting and instructive fact that, in the days of small-pox inoculation, questions very similar to these were raised. Jenner (op. cit. Edit. 3, p. 52) speaks of inoculations "with inefficacious variolous matter" which gave no permanent security, though the immediate results were to all appearance sufficient. In one striking set of cases (p. 80) a surgeon had inoculated "from a pustule which, experience had since proved, was advanced too far to answer the purpose intended." The local results which followed, and the eruptions which appeared about the ninth day (but "died away earlier than common without maturation") were such as induced the operator—and, he says, might have induced any one—"to suppose that the persons were perfectly safe from future infection." But of the five, who were thus inoculated, "four took the small-pox afterwards in the natural way; one of whom died, three "recovered, and the other, being cautious to avoid as much as possible the chance of catching it, escaped from the "disease through [the remaining twelve years of] life."

† It deserves to be noticed however, that so long ago as 1833 Mr. Loy of Whitby gave (Med. Gaz. vol. xii., p. 48) an affirmative answer to the question, "I have observed (he says) in my own practice for many years that "vaccination afforded uniform protection; and since then an influence from vaccination less and less effectual in "resisting the contagion of small-pox;" and after citing instances to justify his belief, that post-vaccinal small-pox was progressively becoming both more frequent and less modified, he comes to a "conclusion, that the vaccine virus had lost parts of its virtues," and recommends "reverting to its origin" as a remedy for this evil.

Successive reports of re-vaccination in the Prussian army.

The case which I put as hypothetical, apparently represents the actual and immense experience of the Prussian army. There, the re-vaccination of recruits is a very uniform test. It extends annually to some forty or forty-five thousand operations. It is reported on annually. Its records run back twenty-four years. Its total result must tell of a million experiments: and the subjects, naturally, are of like age, in like proportions, and under like circumstances. I have already had occasion to say, that when, in 1833, this system of re-vaccination commenced, the proportion of successful results (including cases in which the success came only with a second attempt) was 33 in every hundred vaccinations. Now the annual per-centages of successful results, for the whole time during which re-vaccination has been practised in the Prussian army, beginning with that number, run thus:—33, 39, 42, 46, 49, 50, 51, 54, 57, 58, 57, 57, 58, 60, 64, 64, 64, 61, 64, 69, 69, 69, 69, 70. *The last proportion of success exceeds the double of that with which the series commenced.* Thirty-three per cent. expresses the proportion in which persons vaccinated, say twenty years previously, had, in 1833, to a certain extent lost the influence of their infantine vaccination: it measures the impermanence of certain impressions produced by the vaccinations of 1813. And that impermanence (such as it was) in the effects of vaccination has increased, almost without exception, year by year, during this quarter of a century; *so that the vaccinations of* 1836—tested by eventual re-susceptibility to cow-pox—*were not half so stable as the vaccinations of* 1813.

Inferences as to the frequency of post-vaccinal small-pox.

That post-vaccinal small-pox may depend to some considerable extent on a primary incompleteness of that specific change which vaccination should have excited in the system; and that such incompleteness may have depended on an inactive degenerated state of the vaccine contagion;—these would seem, on analogy, reasonable inferences from the facts I have stated.* More than this I will not venture to say; for that remarkable series of figures, even with the observations previously alleged, does not constitute a proof, though it amply justifies suspicion.

The subject is one that deserves full and patient inquiry. Post-vaccinal small-pox has been a disappointment both to the public and to the medical profession. It has indeed been well to know of it that its attacks are mild in proportion as vaccination has been well performed. But better still would be its utter absence. The information I have quoted to you encourages a belief that, with *uniformly thorough* infantine vaccination, such attacks would be extremely infrequent as well as extremely mild; provided—on the strength of these last intimations—that an essential condition of thorough vaccination shall be the employment of lymph in its utmost original efficiency. Fortunately Mr. Ceely's scientific experiments, and the very useful proceedings of Mr. Badcock at Brighton, have taught the medical profession in this country that it is not requisite to depend, for renewed sources of cow-pox, on the casual occurrence of this disease in the dairy. And, although I do not feel justified in stating it as proved, that what partial insecurity still attends even well-performed vaccination would certainly cease under a more frequent (if careful) imitation of those expedients, yet, at least, I would urge them as deserving deep consideration.

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* It would not also follow that the imputed condition of lymph had been an *inevitable* consequence of its long descent. The alternatives apparently would be these:—either the enfeeblement of the contagion has resulted, slowly but necessarily, from this mere fact of its many successive transmissions;—or else, the effects of personal carelessness in the selection of lymph (see Note, p. xxxvii) are capable of perpetuating and diffusing themselves enough to effect, very considerably, the national statistics of small-pox.

General results as to the good of vaccination.

Finally, then, to sum in a few paragraphs the practical results of this section, the last half-century's experience of vaccination justifies the following assertions:—

that in countries where vaccination is general, the fatality of small-pox has under its influence declined to some small fraction of that which formerly prevailed; that where formerly, in a given population, there would have occurred one hundred deaths by small-pox, there may now occur as few as four or five; and that in this very greatly diminished number annually dying of small-pox the immense majority are unvaccinated or ill-vaccinated persons:

that vaccination performed in infancy in the best manner gives to most persons through life a complete security against attacks of small-pox:

that (in some—hitherto undetermined—proportion to the whole number of the vaccinated) certain persons, as they approach adult life, partially or wholly recover that susceptibility to small-pox which vaccination had once extinguished in them:

that perhaps more universal permanence might be given to the protective influence of infantine vaccination by well-devised arrangements for the periodical renewal of lymph; but certainly, that the renascent liability to small-pox may be guarded against by re-vaccination performed at about the period of puberty:

that even when small-pox is contracted by persons who, having been vaccinated in infancy, have not afterwards thus renewed their protection, the disease is greatly mitigated in favour of these exceptional sufferers; so that among the best-vaccinated of their number, according to the experience of the London Small-pox Hospital, its fatality is but $\frac{1}{70}$ and its chance of being confluent but $\frac{1}{10}$ as compared with the fatality and the chance of confluence of natural small-pox in unvaccinated persons:

that if, beyond the above qualifications, there still remain apparent exceptions to the uniform protective power of vaccination, they illustrate only that very infrequent peculiarity which occasions some individuals (especially in certain families) to suffer natural small-pox itself twice or thrice or even oftener; and

that, if vaccination were universally performed in the best known manner, deaths by small-pox would be among the rarest entries in the register.

IV.—Alleged Drawbacks from the Advantages of Vaccination, and alleged Dangers of its Practice.

Retrospect.

In England, since the termination, fifty years ago, of that important inquiry which was conducted by the College of Physicians, medical literature, even of the obscurest class, contains no more mention of "new, unheard-of, and monstrous diseases," ascribed to the influence of vaccination. Nor, so far as I know, can it be said that any person enjoying in the smallest degree the confidence of the profession, or in the smallest degree entitled to offer an opinion on medical evidence, maintains that properly-performed vaccination is a dangerous proceeding. Diseases produced by vaccination occupy in medical teaching and medical conversation about the same space as diseases produced by witchcraft and the evil eye; and it seems a waste of time to revert to what, even half a century back, was recognized to be mere stupidity or mischief-making.

Foreign echoes of our old controversy.

But in some other parts of the world these questions were not in the first instance so freely canvassed as in England; and perhaps on this account it may be that within the last ten years there have been published abroad papers which correspond to our Stuart-and-Rowley period in the history of vaccination. To the English medical reader such papers, if they come at all, come only as a kind of literary fossil; reminding him of something so utterly unpractical, ante-diluvian, and extinct, that the last act he would think of committing against them, would be to argue. Yet these foreign publications obtained a momentary notice in the last Parliament. And now, standing at the very threshold of the subject on which I must enter, they compel some recognition at my hands.

It is really quite impossible for me to speak of such writings with even the semblance of respect. I am willing to believe that the authors are not actuated by unworthy intentions. But the works are so ignorantly and so impudently written—their staple consists of such reckless guesswork or such mere declamation and balderdash—that it would be a mockery to treat them as belonging to the literature of science.* I can regard them only as trivial romances; and accordingly, while I propose discussing in this section of my Letter every substantial statement which has been raised against the practice of vaccination, I must claim to leave unfollowed the mere meanderings of nonsense in which those writers indulge. Instead of arguing with them whether vaccination has increased men's consumption of tobacco and lessened their tendency to dance, I will bring before you—in reference to more important issues—such accurate knowledge as I can gather, from national statistics and from the records of scientific experience, as to the real health of vaccinated populations.

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* M. Verdé de Lisle (de la Dégénérescence Physique et Morale de l'Espèce Humaine déterminé par le Vaccin; Paris, 1855) opens his case thus:—" L'espèce humaine dégénère; aux puissantes races des siècles passés a succédé une
" génération petite, maigre, chétive, chauve, myope, dont le caractère est triste, l'imagination sèche, l'esprit pauvre
" . . Remontons enfin à l'origine: la cause unique de ce désastre multiple, c'est la vaccine . Voyez cette
" génération inerte, rachitique, frappée en naissant d'impuissance et de vieillesse. Prenez-la dès le collége, froide, en
" proie à une paresse triste . pauvres enfants, qui n'admettent que la malice paisible, pour qui l'espièglerie est
" trop gaie, l'exercise trop fatiguant . . Suivez-les . ils n'ont jamais dansé . . Rappelez-vous nos pères, la
" forte race de l'empire? aujourd'hui les compagnies d'hommes de cinq pieds six pouces appartiennent à l'histoire . .
" Après Voltaire, après Beaumarchais . le triste spectacle d'une foule de petits personnages qui ne peuvent
" élever leur présomption plus haut que la collaboration et la critique . . L'Angleterre . n'a même plus
" ni un Sheridan, ni un Dryden quelconque; son éloquence parlementaire s'arrête à la pléiade contemporaine de
" Lord Palmerston. L'Allemagne . s'est arrêtée à Jean Paul . . En musique, à défaut des Gluck, des Mozart
" . des Boieldieu . le métier nous donne les nombreux arrangeurs. En peinture, après les Rubens, les Van-Dick
" . il nous faut tomber sans transition de la puissance de Géricault à la patience de Meisonnier. . . On prétend
" être sérieux; tout simplement on est grave et ennuyé. . A un mal, ils en ajoutent un autre; ils compliquent le
" premier empoissonnement, ils fument pour avoir l'air de penser . . Les exemptions du service militaire .
" ont pris des proportions de plus en plus considérables. . . A quoi bon l'air? Les pores de la peau sont
" oblitérés, les poumons sont tuberculisés. . A quoi bon la nourriture saine? à quoi bon préserver l'économie des
" miasme pestilentiels?" etc.

It requires no medical knowledge to gauge the capacity of this fiction. Its nonsense is only to be equalled in burlesque literature; and perhaps the nearest parallel is presented in a familiar line of the *Rejected Addresses*, where the indignant author of " A Loyal Effusion" intimated that Napoleon Buonaparte had " filled the butchers' shops with large blue flies." The physical degeneration of man is, indeed, an old cry. Every age in its turn has looked back wistfully on some imagined possession of the golden past—some strength, or stature, or nobility which belonged exclusively to its good old times. Not two of Homer's contemporaries (οἷοι νῦν βροτοί εἰσι) could move such stones as Ajax and Æneas hurled; and the same tendency to believe in a gradual degeneration of mankind has, from then till now, been expressed in innumerable forms. That " the world is in its dotage," is a doctrine which, a century ago, was sufficiently current and sufficiently ridiculous to be used for the purposes of the humorist. The reader of the Vicar of Wakefield remembers it in the mouth of Ephraim Jenkinson as representing just that sort of gabble which could be used for the stock-speech of a sham philosopher; and Dr. Primrose might well, on the second occasion, think he had " heard all this before."

Questions which may fairly be asked.

For undoubtedly, as to alleged incidental evils of vaccination, there are questions which may reasonably be asked. The fifty-nine years' experience which has established the merits of vaccination—has it shown any countervailing harm? Have vaccinated persons, in acquiring their insusceptibility to small-pox, become more susceptible of any other disease? Has anything tended to show that vaccination, however perfect for its purposes, is in other respects a disadvantage?

Fallacy to be guarded against in putting the question.

In proceeding to investigate this matter, there is, first, a source of fallacy to be guarded against. Those millions whom vaccination saves from one kind of premature death must of course die eventually. Susceptibility to small-pox is a very definite state of body; equally definite and distinct are the susceptibilities to other specific diseases; and it has never been pretended that man becomes less susceptible of one because he is less susceptible of the others. Vaccination is directed against the one susceptibility only; and a child whose liability to small-pox has just been extinguished by well-performed vaccination may to-morrow, like an unvaccinated child, be run over, or be drowned, or sicken of measles, or suffer with teething, or be struck with any other of the numberless shafts of death. And the vaccinated subject advancing to adolescence, to mid-life, or to old age, must encounter, like the unvaccinated, the several risks of each period of life. And obviously, if vaccination on a given day in England secures a thousand lives against death by small-pox, sooner or later those lives will be subject to the inevitable lot; sooner or later the thousand deaths will be written against the names of other diseases than small-pox; and such diseases may then be said to have been rendered more frequent by vaccination. In the same sense every life that is snatched from fire, or flood, or poison, counts at last as a death from some other cause; and to say *in this sense* that such causes are more fatal than before vaccination, is but another form of saying, what Jenner would most have wished to hear, that small-pox is less fatal than it was.

Question in its amended form.

But are deaths *proportionally* more numerous? On a given number of persons (say a million) is the general death-rate higher, or is the death-rate at any particular age higher, or is the death-rate of any particular disease higher, now, than in the days of inoculated or natural small-pox? Has the suppressed mortality of small-pox commuted itself for other premature death?

The material of vital statistics is hitherto not sufficiently perfect; indeed, the science in its more precise applications is of too recent date, for this question to be answered exhaustively. But I have collected some very strong statistical evidence on the subject; and, such as it is, it tallies very thoroughly with what pathology would suggest as probable—that to have mitigated the horrors of small-pox, is, indeed, an unmixed good.

I. General death-rates.

First, for the *general death-rates:*—Taking all ages together and all diseases together, what used to be before the practice of vaccination, and what has been since the practice of vaccination, the annual proportion of deaths to a given number of living persons?

England.

London.

As regards England, the means of comparing death-rates are confined to London; for before 1838 there was no general registration of deaths; and even in London they must be regarded as only approximative to the truth. During times before vaccination, there were the old Bills of Mortality; and for the last twenty years there are the Registrar General's reports. The Bills of Mortality are notoriously imperfect. They record not deaths, as such, but burials; and not all burials within the given area, but only parochial Church of England burials. Therefore much may have been omitted from them. But it is satisfactory to know, for the purposes of the present comparison, that whatever imperfectness there is in these records would make the older times appear less unhealthy than they were.

Now the question being—whether in proportion to the diminution of small-pox, there have grown up other influences to neutralize or even reverse the advantage, I am able, so far as the general death-rate of London is concerned, to give you the following evidence. My colleague, Dr. Greenhow, Lecturer on Public Health at St. Thomas's Hospital, has made an elaborate examination of the Bills of Mortality at two different periods, far apart, before the discovery of vaccination; selecting the two particular decennial terms, 1681–90 and 1746–55, only because at a central year in each of these terms the population of London was estimated, and this estimate of population is a necessary element in the comparison. Dr. Greenhow has kindly assisted me with a paper (Appendix H.) in which he gives at length the results of this interesting comparison; and I attach the more importance to his conclusions as I know that they have been arrived at with caution and impartiality. The annexed Table gives an abstract of so much as relates to the present point. It enables you, at a glance, to judge, in respect of London at least, how far it would be correct to say, that, with the decline of small-pox, the general death-rate of the population has increased. You will notice that in the decennial period 1846–55,—*though epidemic influenza and two visitations of cholera* fell within it,—the general death-rate per 10,000 of living population was 25 per cent. less than in the decennial period 1746–55, and 40 per cent. less than in the decennial period 1681–90; having successively declined since the remoter period from 421 to 355, and from 355 to 249.

Average Annual Death-rates in London from all Causes and at all Ages.

Date.	Per 10,000 living.
1681–90 -	421
1746–55 -	355
1846–55 -	249

Materials for a similar but more extensive comparison are given from the pen of Dr. Farr, in the fourth edition (vol. ii. p. 613) of McCulloch's "Descriptive and Statistical Account of the British Empire." From this valuable paper I have extracted (seq. pag. lv) a Table which is of great interest in reference to all the present section of my subject; and I here insert from it those totals which illustrate the point I am discussing.

You will observe, that in the successive lines of the annexed Table the general death-rates of London are given for seven different periods of time during more than two centuries. The first line (A) shows for the period 1629–35 (though almost exempt from epidemic disease) a general death-rate just double our present one; in the second line (B) it is seen that for the twenty years 1660–79 (including the fatal one 1665) the rate was $3\frac{1}{5}$ times as great as it now is; and in the fourth line (D) it is shown, that during ten years (1771–80) towards the end of last century, when small-pox was fourteen or fifteen times as fatal as now, the general death-rate was still double.

Average Annual Death-rates in London from all Causes and at all Ages.

Date.	Per 10,000 living.
A. 1629–35	500
B. 1660–79	800
C. 1728–57	520
D. 1771–80	500
E. 1801–10	292
F. 1831–5	320
G. 1840–54	$248\frac{8}{10}$

Denmark.

Means of extending such comparisons to other countries than our own are but scanty; yet fortunately there are illustrations enough to show that London is not alone in respect of the evidence which it gives. A statistical sheet (App. p. 171) which accompanied the general information given us by the Danish Government, contains an account relating to the city of Copenhagen, not only of deaths by small-pox for the years 1750–1850, but also of the total deaths, and of the births and population, during the same long period—half a century before and half a century after the introduction of vaccination. Causes of death are not (except small-pox) specially noticed; but the general result is enough to show that the statistics of Copenhagen concur with the statistics of London: for the sheet in question gives evidence of progressive improvement in the health of the population, and the year 1823, when for thirteen consecutive years there had not been a single death from small-pox, was also in other respects among the healthiest of the series. And the general progress of the population may be inferred from these particulars:—Of the 26 years 1750–75 there were 23 in which the deaths exceeded the births:—of the 40 years 1776–1815 there were 25 in which the deaths exceeded the births:—during the 35 years 1816–50 the births have exceeded the deaths on all but six occasions. Annually during the first period there were on an average 853 more deaths than births: annually during the last period, there were on an average, 304 more births than deaths.*

Births and Deaths in Copenhagen.	Excess of Births over Deaths.	Excess of Deaths over Births.	Average Annual Excess.
1750-75	—	22,186	Deaths 853
1776–1815	—	3,285	Deaths 82
1816–50	10,648	—	Births 304

Sweden.

The more minute statistics of Sweden (to which I must presently refer again) are equally silent as to those compensatory deaths which the suppression of small-pox is imagined to cause. In the annexed Table, ranging through the past hundred years, it is seen that in that well-vaccinated country the general death-rate of the population in 1841–50 is 29 per cent. lower than it was in 1755–75. If a third of this improvement be due to the comparative absence of small-pox, the remaining two thirds must be referred to the simultaneous decrease of other diseases.

Average Annual Death-rate in Sweden from all Causes and at all Ages.

Date.	Per 10,000 living.
1755–75 -	289
1776–95 - -	268
1821–40 -	233
1841–50 - -	205

N.B.—The *annual* small-pox death-rate during the period 1841-50 averaged less than the *weekly* death-rate from small-pox and measles during the period 1755-75.

Conclusion from general death-rates.

So far, then, as these populations are concerned, it appears that, while under the influence of vaccination small-pox has been diminishing its ravages, so under other influences have other diseases been diminishing theirs. Under other influences, I say:—for the causes of fever, the causes of cholera, the causes of consumption, are several and special causes. Each disease is affected for better or worse by influences proper to itself; and the prevention of small-pox no more implies the prevention of fever than to sow barley implies the reaping of wheat. But what has to be noticed (so far as these materials inform us) is, that annihilation of small-pox may be tried for as an unqualified physical good; that hitherto there is no trace of evidence that other diseases become more malignant in proportion as that one is subdued.

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* Eighty years ago the notion that London might contain an increasing population seems to have been strange to men's minds. In a pamphlet of that period (Letter to Dr. Lettsom, by an uninterested Spectator of the Controversy upon General Inoculation: London, 1779) I read the following paragraph:—" I claim not the merit of starting this " idea of an increased population in London as a novelty; it has been hinted by others, particularly by yourself in " your medical memoirs, and by a writer who signs J. S.... but I think his reasoning is not quite conclusive."

II. Death-rates at particular ages and from particular diseases.

It now remains to be seen, whether, by a more detailed analysis of mortuary records—by inquiry into the death-rates of particular ages and into the prevalence of particular diseases—it may perhaps be possible to discover any kind of evil which the general death-rates have failed to betray.

M. Carnot's doctrine.

Recent pamphleteers against vaccination chiefly rely on certain fragmentary statistics, collected with more zeal than judgment by a former artillery officer, M. Carnot.* This writer believes he has discovered what he calls a *displacement of mortality;* namely, that within the present century deaths which used to occur in early infancy have come to occur between the ages of 15 and 30. He alleges that the female death-rate in Paris for the ages 15–25 has doubled in the last 38 years; that the annual mortality of the French army on home-service was 2 per 100 during the period 1819–47, but had been only 1 per 100 before the Revolution of 1789; that of male and female deaths in Paris at ages above 15 only 35 per 100 used to happen between the ages of 15 and 45, and that now 50 per 100 are in this category: that the chances of an infant reaching 41 years of age are the same now as they were in the last century; that the death-lists of Paris for 1840–9, compared with those for 50 years previously, show some diseases (typhus, cholera, dysentery, and colic) to have increased almost as much as others (small-pox, measles, convulsions, and croup) have declined; that the annual marriages in France exceed twice as much as they forty years ago exceeded the marrying proportion (⅘) of females who annually (on Duvillard's estimate) reach the connubial time of life, and that this increase denotes a doubled annual number of second marriages, or in other words a doubled annual quantity of early widowhood; that with a greatly increased number of marriages in France there is a diminished number of births; that the births are rapidly tending to become less numerous than the deaths; that the depopulation of France is an imminent danger, which must begin to realize itself within the next few years; that gastro-intestinal disease — especially typhoid fever — is the agent of this destruction; and finally, that the cause of this complicated derangement is the practice of vaccination.

Its logic.

Now first, let the concluding word of the summary be criticized. M. Carnot's statistics allege a difference in adult vitality between the France of to-day and the France of last century. Supposing the statistics to be correct, does he give any sufficient reason for ascribing to vaccination that deteriorated state of adult life which he professes to have discovered? So little does he this, that in any of the sentences where damnatory conclusions are drawn, if there were substituted at hazard for his word *vaccination* the mention of any other historical event belonging to about the same period of time as Jenner's discovery, M. Carnot's logic would scarcely suffer by the change, or his new conclusion be less warrantable than his first. *Post ergo propter* was never more whimsically illustrated. For the argument goes simply to claim as the *effect* of vaccination whatever evils have happened *since* its discovery; and M. Carnot's moderation may be praised, that, with the infinite resources of this proof, he did not also convict Jenner of causing last year's inundations of the Rhone.

Its facts.

But are the facts such as M. Carnot pretends? I do not feel myself competent to discuss a doubtful question in the vital statistics of France; for I am but imperfectly acquainted with the relative value of those semi-official documents to which reference is made.*

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* Essai de Mortalité comparée avant et depuis l'introduction de la Vaccine en France; Autun, 1849; followed by an *Appendice:*—Analyse de l'influence exercée par la variole, ainsi que par la réaction vaccinale; Autun, 1851:—Parallèle de l'état sanitaire de Paris avant et depuis la vaccine; Rév. Méd. 1856.

M. Dupin's counter-statements.

Instead of offering opinions of my own, I will inform you that immediately after the publication of M. Carnot's first statements, M. Charles Dupin, before the Academy of Sciences (Nov. 20, 1848) treated the pretended discovery as an unmodified mare's-nest, and soon afterwards (Dec. 4) advanced counter-statistics, which claimed to show the expectation of human life at every age in France as having notably improved since the last century.†

Dr. Bertillon's calculations.

More recently, Dr. Bertillon, Physician to the Hospice de Montmorency, after statistical researches which include both periods under discussion, has communicated to the Academy of Medicine results which are in direct opposition to M. Carnot's deductions.‡ In the Vaccination Report for 1854 of the Academy of Medicine, M. Bertillon's labours are mentioned in terms of the highest praise, and his conclusions are adopted without reserve.

The subjoined Table gives a summary of these conclusions, as stated in the report of the Academy. It states, for eleven periods of life, what was and what is the average expectation of death, viz. :—first, for different times in the last century, according to the several accounts successively published (1749–1806) by Dupré St. Maur, Montyon, Messance, and Duvillard; and, secondly, for the years 1849–50, according to M. Heuschling's account of the deaths in France and to several recent accounts (one of them founded on census) of the French population. In the fourth line (which is critical for the present question) the Table is read thus :—For persons aged between 20 and 30 the chance of dying was, in the first period, one in 67·97; in the second period, one in 66·40; in the third period, one in 64·67; in the fourth period, one in 73·55; in the fifth period, according to various more or less defective estimates of the population (the first of which specially illustrates a statistical fallacy) one in 73·38, one in 86·20, one in 92·80; or finally, according to the census of the population, one in 93. Or if—simplifying the comparison—we take only the first column, which corresponds to the middle of last century, with the last column, which purports to be the most trustworthy account of the present state of life in France; and reduce the figures in both to the form of *death-rates per* 10,000 *living at the ages in question,* we find it stated, that for persons aged between twenty and thirty the death-rate used to be 147, and is now only 107½; that for persons aged between thirty and forty the death-rate used to be 215, and is now only 97.

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* Only I must observe that M. Carnot's superstructure of arithmetical conclusions rests on a treacherous basis; for his main argument proceeds from certain assumptions as to the ages of the population, and I have reason to believe that such assumptions are little warranted by existing knowledge. Death-rates at given ages, and expectations of life at given ages, are questions of proportion between the two quantities—how many at such ages are *living* and how many at such ages *die?* The latter element may generally be gathered from civil registers; but the former can only be got from a census of the population classified according to ages; and I am not aware that any such census had been made in France before the present century.

† M. Dupin concludes his paper in the following terms:—" L'allongement de la vie à toutes les époques de " l'enfance, de l'adolescence, de la virilité, de l'âge mûr et de la vieillesse, pour les personnes de conformation pareille, " voilà le grand fait établi par les comparaisons rigoureuses que nous venons de présenter. C'est le bienfait obtenu " par les progrès des sciences et des arts appliqués au bien-être du genre humain. Formons des vœux pour que nos " demonstrations mathématiques mettent un terme aux assertions erronées, et désolantes, propagées par mille écrits " et par mille déclamations qui s'appuient sur les mortalités prétendues croissantes par l'effet du malheur et de la " misère, qui diminuent au lieu d'augmenter notre patrie."—Comptes Rendus de l'Acad. vol. xxvii. p. 571.

‡ L'Union Médicale, 1855; and Rapport sur les Vaccinations pratiquées en France pendant l'année 1854. This Report, though relating to 1854, is but recently published, and was not received here till March 25, 1857.

Chances against Death $\left(\frac{\text{Pop.}}{\text{D.}}\right)$ at different Ages of Life.	Successive periods of 18th century.				1849—50. Deaths by Heuschling, and Population by various authorities.			
	Dupré St. Maur.	Montyon.	Messance.	Duvillard.	Population cited as fallacious.	Population by Guillard.	Population by Mathieu.	Population by Census of 1851.
0 to 5 years	7·17	7·05	9·59	8·28	12·05	13·60	14·80	13·19
5 „ 10 „	50·16	48·90	41·93	88·10	78·11	91·80	98·80	93·57
10 „ 20 „	113·90	103·80	85·30	108·00	124·74	146·30	157·90	151·50
20 „ 30 „	67·97	66·40	64·67	73·55	73·38	86·20	92·80	93·00
30 „ 40 „	46·45	47·56	58·00	58·73	78·85	92·66	95·80	103·00
40 „ 50 „	38·34	38·67	45·00	46·14	60·57	71·20	70·40	77·00
50 „ 60 „	26·92	28·11	32·00	30·72	34·47	51·00	48·20	54·00
60 „ 70 „	17·17	17·17	18·00	17·31	21·78	25·28	23·30	24·20
70 „ 80 „	8·21	8·21	10·35	8·84	10·37	12·18	10·58	10·50
80 „ 90 „	5·63	5·56	6·68	4·68	5·21	6·12	4·78	4·48
90 „ 00 „		3·84	5·34	3·87	3·76	4·17	2·82	2·73

Estimate by the French Academy of Medicine of the above statement and counter-statements.

The following are the terms in which the French Academy of Medicine reports its judgment on Dr. Bertillon's work, and on the controversy which occasioned it :—

" De cette longue et laborieuse investigation il résulte que, de quelque manière qu'on interprète les " documents anciens et nouveaux de la statistique, à la condition de n'abdiquer ni les lois de la logique " ni celles de la science, on arrive à des conclusions écrasantes pour les adversaires de la vaccine en particulier, et en général pour les contempteurs sceptiques du progrès. Car ce n'est pas par l'examen d'un ou " deux documents individuels, c'est par l'accord unanime de tous les documents, qu'il est démontré que, " depuis le siècle passé, depuis l'époque qui a précédé immédiatement notre grande révolution, la mortalité " s'est considérablement atténuée à toutes les périodes de la vie ; que particulièrement de vingt à trente " ans, âge auquel, d'après les anti-vaccinateurs, la variole, d'abord vaincue, exercerait sournoisement de " mortelles représailles, le danger de mort a diminué d'environ un quart. Aujourd'hui, 1,000 citoyens de " vingt à trente ans ne fournissent que 10 à 11 décès, tandis qu'autrefois le même nombre de sujets " en donnait au moins 13 à 14. Et les autres âges sont beaucoup plus favorisés que celui-ci !

" Enfin, bien que, pour l'armée et pour la ville de Paris, les documents soient insuffisants pour mesurer " avec exactitude, même depuis 1820, la diminution de mortalité, ils suffisent pour affirmer qu'il n'y a eu " nulle aggravation ; tandis qu'au contraire des considerations puisantes démontrent pour Paris une " tendance manifeste, dans un si court espace de temps, à la diminution des chances de mort, bien que le " regrettable silence de la municipalité ne nous permette pas de dégager complément cette tendance pour " l'apprécier numériquement. Rien, par consequent, absolument rien qui puisse motiver les excentriques et " persévérantes assertions des détracteurs de la vaccine.

" Si nous voulons résumer les causes qui les ont égarés, nous dirons que toutes leurs erreurs ont pour " source commune l'ignorance des principes de la statistique et l'inexpérience de sa méthode, le manque complet de discussion et de critique, critique d'autant plus indispensable que les documents sont plus imparfaits " A chaque instant on les voit s'appuyer sur des hypothèses en contradiction formelle avec les conclusions " bien connues de célèbres et nombreux travaux. On les voit prendre pour mesure de la mortalité moyenne " d'une nation, ici la mortalité allégée des rentiers, ailleurs la mortalité aggravée des soldats. Plus loin, " il confondent la table de survie avec la table de population, et tirent de l'une les conclusions que l'autre " seule permettait. N'ayant aucune notion des lois qui régissent les mouvements de population, ils " prennent pour une calamité la diminution lente et progressive des naissances, bien que ce mouvement " régulier suive la prolongation de la vie humaine, et détermine dans la nation la prédominance des âges " producteurs. S'ils veulent la survie applicable à une ville dont la population est la plus mobile, la plus " incessamment et profondément remuée dans toutes ses parties, ils se servent d'une methode qui suppose " l'immobilité et la régularité absolue dans la succession des vivants et des mourants. Ils supposent " stationnaire une population croissante ; ils la supposent décroissantes suivant les âges, quand elle croît " d'un âge à l'autre.

"Il ne leur suffit point de se jouer si audacieusement de la statistique; ils ne respectent pas davantage "les simples lois du calcul. Ils raisonnent, avec des quantités qui ne sont vraies que relativement à "d'autres, comme si elles étaient vraie absolument. Ailleurs, au contraire, quand un rapport seul peut les "instruire du danger de mort, ils omettent de s'en informer. Et ce qui est plus étrange encore que tous ces "contre-sens, que tous ces défis portés à la science, c'est l'aisance parfaite avec laquelle ils s'y abandonnent, "ne paraissant pas se douter que ces matières aient pu être traitées avant eux; c'est sans discussion "préalable qu'ils supposent non avenus les célèbres travaux des Malthus, des d'Ivernois, des Benoiston "des Villermé, des Quetelet, en sorte que ce qu'on peut faire de mieux en leur faveur est d'accuser leur "instruction pour disculper la légèreté de leur procédés."*

Observation of other countries.

Thus much in answer to the question, whether the main facts of the case are such as M. Carnot pretends. A very slow increase, or possibly a decrease, of the French population at the present time seems indeed to be an admitted fact: and it is stated (I believe on the authority of official documents) that the standard of height for admission to the French army has of late years of necessity been reduced, because of the decreased stature of the general population; while nevertheless the proportion of conscripts found physically incapable of service has undergone a continuous increase.†

Be it so. Admit these allegations. Admit also every arithmetical conclusion, however contested, which M. Carnot founds on ambiguous fragments of imperfect local evidence. Admit every hypochondriacal presentiment—every assertion which M. Dupin and Dr. Bertillon and the French Academy of Medicine concurrently declare to consist in mere statistical error. And what then? Would any reasonable person proceed from these particulars to construct a universal theory (the first deduction from which must be that such particulars are general in Europe) never verifying his theory by any second instance, never looking for those imputed effects of that same cause in other lands where it operates? Should it not be a first impulse to ask, are these things so elsewhere? Do other countries suffer like this pitiable image of France? Is England beginning to be depopulated? are its women becoming less fruitful? Does Sweden show a *déplacement de la mortalité?* is its adult life now more precarious than fifty years back? In Geneva, where mortuary records have been kept for three centuries, are any such results reported? Is the re-vaccinated army of Prussia wasting away with a quadrupled mortality? Does Bavaria, among its conscripts for military service, show an increased proportion of incapables?

The most cursory examination of this kind might have convinced M. Carnot, that, whether his arithmetic be right or wrong, his medical conclusions are untenable.

Increase of population in Great Britain.

He might have read, for instance, in the Report of the Census of Great Britain in 1851, an announcement (I. p. 82) that "the most important result which the inquiry establishes is, the addition in half a century of ten millions of people to the British population; that "the increase of population in the half of this century nearly equals the increase in all "preceding ages; and that the addition in the last ten years of 2,300,000 to the inhabitants "of these islands exceeds the increase in the last fifty years of the eighteenth century." Or, so far as relates to the nineteen years during which a general registration of births has existed in England, he might have learned that, with us, at least, there is no evidence of a failing fecundity; that in the early part of this period (1838—40) for every 1,000 women aged between 15 and 45 there were registered 133⅓ living births, and in the latter part of the period (1851—6) for every 1,000 such women 144⅓ living births.

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* Rapport sur les Vaccinations de 1854, pp. 66–9.

† It is beyond my present business even to question the truth of these assertions; much more, to investigate, what, if they be true, may have been the real causes of the alleged deterioration and comparative sterility of the French people. The subject has been a good deal discussed in the periodical literature of the day; and there M. Carnot may easily learn that for his favorite facts there exist more reasonable explanations than his own.

Death-rates of different ages in Sweden.

And whatever fallacy belongs to the imperfect condition of vital statistics in France might have been avoided, if M. Carnot had but studied the admirable records of Sweden; where not only would he have found, in respect of that well-vaccinated country, no evidence of the "displacement of mortality" which he ascribes to vaccination, but would have seen how much better now than during last century are the chances of every period of life. In the annexed Table (for which I have to thank Dr. Farr) an abstract is given of the Swedish returns. You will observe that even in the penultimate period (within which the fatal cholera epidemic of 1834 killed 12,637 persons) the population at all ages under 30 years of age, consisting of course for the most part of vaccinated persons, showed a much less death-rate than the population of the like ages in the former century. And in the next period (1841–50) when vaccination would have affected at least all ages up to that of 40 years, the corresponding death-rates show an improvement on the earlier viceniad 1821–40, and a still more striking improvement on the death-rates of the last century.

ANNUAL MORTALITY TO 1,000 PERSONS LIVING.

Ages.	21 Years (1755–75).	20 Years (1776–95).	20 Years (1821–40).	10 Years (1841–50).
0– 5 - -	90·1	85·0	**64·3**	**56·9**
5–10 - -	14·2	13·6	**7·6**	**7·8**
10–15 - -	6·6	6·2	**4·7**	**4·4**
15–20 - -	7·6	7·0	**4·9**	**4·8**
20–30 -	9·2	8·9	**7·8**	**6·8**
30–40 - -	12·2	11·6	11·8	**9·8**
40–50 - -	17·4	16·1	16·7	14·5
50–60 -	26·4	23·9	26·0	23·6
60–70 - -	48·1	49·3	49·4	46·3
70–80 - -	102·3	104·1	112·9	102·8
80–90 - -	207·8	197·4	243·7	228·5
90 and upwards	394·1	351·3	396·4	375·8
All Ages -	28·9	26·8	23·3	20·5

The figures which are put in larger type relate to that section of the population which has been born since the introduction of vaccination, and of which (persons under 30 in the fourth, and under 40 in the fifth column) the greatest part is undoubtedly vaccinated. Of persons ten years older, especially in the last column, many are vaccinated; of persons still older, a diminished and diminishing proportion.

As regards the City and Canton of Geneva—specially interesting for comparison because of the great length of time over which the records extend—M. D'Espine, with no controversial object, arrived some years ago at results which can afford no encouragement to M. Carnot; and the appended Table is part of one in which M. D'Espine has very compendiously expressed his conclusions. You will observe, that although in its first column it bears testimony to the diminished pressure of infantile disease, the mortality which has been saved to infancy and childhood shows no signs of having been displaced into the next following periods of life. On the contrary, while the per-cental chance at birth of living to 10 years of age has increased in Geneva within the last century from 60 to 74; the per-cental chance for those who complete 10 years, that they will continue living to the age of 40, has increased from 68 to 72.

Survivance in Geneva at various Periods from 1560 to 1843.	Per-centage of those Born who reach 10 Years of Age.	Per-centage of those Living at 10 Years of Age who survive to 40.
City of Geneva:		
1560—1600	42	43
1601—1700	48	53
1701—1760	60	68
1761—1800	61	71
1801—1813	69	·72
1814—1833	74	72
City and Suburbs:		
1816—1830	74	74
Canton:		
1838—1843	74	71

Annales d'Hygiène publ. et de Méd. légale, tom. xxxviii.

England.

The English population was never classified according to ages till the census of 1841; and therefore a similar comparison between its past and present condition is not possible. But at least, in looking at the composition of a given number of deaths now and in the previous century, it is easy, where one compares similar populations, to see that deaths in early adult life have not taken the place of those which formerly befell infancy. Thus, if I contrast Dr. Short's account* of 405,951 deaths within the Bills of Mortality of London for the years 1728-43 with an account† which I kept of 22,332 deaths registered within the City of London during the years 1848-55, I find (as in the annexed Table) that the two periods differ considerably as to the proportion which different ages contributed to every thousand deaths. In the former period, persons aged sixty and upwards were only 136 per 1,000; in the latter period, were 216. In the former period, deaths under forty years of age were 689 per 1,000; in the latter period, only 602. And of deaths at ages above fifteen, those between fifteen and forty-five constituted in the later period not (as in Paris) 50, but about 37 per cent. This argument, of course, is not nearly so good in kind as might be drawn from the divisional death-rates of a population classified according to age; but the latter material, as I have said, is inaccessible;‡ and I adduce the present argument, though unsatisfactory, chiefly because M. Carnot has used it in respect of the Parisian population: and I wish to notice, in illustration of the essentially local character of his facts (if facts they be) that the mortuary records of London and Paris would lead him to opposite conclusions.

COMPOSITION OF 1,000 DEATHS IN LONDON AT TWO DIFFERENT PERIODS.

Ages.	Bills of Mortality, 1728-43.	Registration of City of London, 1848-55.
0- 5	455	375
5-10	36	42
10-20	31	42
20-30	76	63
30-40	91	80
40-50	93	90
50-60	82	92
60-70	62	100
Over 70	74	116

Military establishments.

Similarly, when M. Carnot deplores—it is said, mistakenly—the enfeebled health of the French Army, *infiniment moins capable que leurs devanciers de supporter les privations et les fatigues inséparables de la guerre;* and when another statistician of the same school alleges that the proportion of French conscripts declared physically unfit for military service has, since 1816, been an increasing one; how obvious the course, if one would understand such facts (assuming them for the moment to be facts) to inquire whether they belong only to France, or are common to many European countries. Such an inquiry would have led the alarmists to doubt the accuracy of their own local observations. It would have told them that in the Bavarian army,* during the period 1821–51, the per-centage of physically unavailable conscripts has not increased, but diminished, from 23⅓ at the beginning of the period to 21¾ at its close: that in this army, vaccinated and re-vaccinated as it is, the death-rate for the years 1844-7 has been even better than that somewhat arbitrary standard of healthiness which M. Carnot adopts from Deparcieux's *select* lives of the last century; and that in the Belgian and Prussian armies, according to the same authority, the death-rates were little less favourable.

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* New Observations on City, Town, and Country Bills of Mortality, &c. By Thomas Short, M.D. London, 1750, p. 92.

† Report on the Sanitary Condition of the City of London for the year 1854-5, Table VI.

‡ The only approach to a standard of comparison is that very limited one furnished by the Tontines of 1774-8 and 1790; but this (besides being insecure from the smallness of its material) is made almost inapplicable for my present purpose by the fact that the nominees in these Tontines were *selected*—chiefly of course with reference to their chances of comfort and longevity; and to compare our *average* death-rates with the death-rates of a population so selected, would be to defeat the objects of comparison. Mr. Finlaison has kindly obliged me with his calculation of the Tontine death-rates, and I have embodied them in the subjoined table side by side with certain other death-rates for the same periods of life. For special comparison with the Tontine death-rates, I have inserted the death-rates of two populations of the present time, where circumstances operated in some respect equivalently to the selection which I have described. I have taken, first, the *death-rates of the provident classes* from materials given by Mr. Neison in his recent contributions to vital statistics; and secondly, the *death-rates of the population of the 63 healthiest registration districts of England and Wales,* as estimated by Dr. Farr. These populations—the former in respect of somewhat easier circumstances and better-regulated lives, the latter in respect of advantages of residence —may be considered as select populations, fairly comparable with Tontinists. I have also inserted in the table the general (unselected) death-rates of England and Wales, as given by the Registrar General for the years 1845-54. I must, however, confess that the standard of comparison appears to me radically defective. The great difference between the death-rates of the two sexes of Tontinists shows, I think, one of two things: either that the population-basis of these calculations has been too small for a trustworthy result, and that some fallacy affects the death-rate of one sex or the other; or else that circumstances, unknown to the present age, did really at the periods referred to make that large difference between the death-rates of the sexes. In either case it would be unsafe to draw conclusions from the comparison; and therefore it is that the table is set here rather than inserted in the text. In the last part of the

The preceding evidence will have satisfied you, I think, that M. Carnot's assertions are such as he cannot substantiate. You have seen that, even as regards France, his fundamental statements are flatly contradicted; and that the sanitary statistics of France, if they were such as M. Carnot pretends, would bear no such particular reference to the subject of vaccination, nor be so corroborated by the statistics of other countries, as in any degree to justify his conclusions.

Death-rates by particular diseases.

Yet let me beg you, before leaving the subject, to look at it in one other aspect. Although the accusers have not been very scrupulous about their arguments, still they have thought it necessary to enter into some detail as to the mode in which the world is to be depopulated, and as to the symptoms of that vaccination-poisoning which they denounce. It is well that they have done so. The more detailed an inquiry, the more advantageous it becomes to truth; and those who are accustomed to the cross-examination of witnesses, will not wonder that the traducers of vaccination have committed themselves to opposite details.†

Whether these gentlemen agree or differ is, after all, of little importance. They are so ignorant of medicine, that what they accept or reject is a matter of no scientific moment.

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table is set the mean rate for the two sexes in respect of each of the five populations compared, and in this of course the discrepancy is concealed. But I am not prepared to say that any trustworthy conclusion may be drawn from it.

ANNUAL DEATH-RATE PER 10,000 LIVING AT AGES AND IN POPULATIONS AS BELOW.

AGES.	MALES.					FEMALES.					MEAN.					AGES.
	Tontines of 1774–8.	Tontine of 1790.	Friendly Societies of Great Britain.	Sixty-three Healthy Districts of England, 1849–53.	England and Wales (Reg. Gen.) 1845–54.	Tontines of 1774–8.	Tontine of 1790.	Friendly Societies of Great Britain.	Sixty-three Healthy Districts of England, 1849–53.	England and Wales (Reg. Gen.) 1845–54.	Tontines of 1774–8.	Tontine of 1790.	Friendly Societies of Great Britain.	Sixty-three Healthy Districts of England, 1849–53.	England and Wales (Reg. Gen.) 1845–54.	
15–25 - -	111·467	118·634	61·9	69·1	83.3	83·149	84·268	66·5	7·65	86·3	97·308	101·451	64·2	72·8	84·8	15–25
25–35 - -	117·302	118·683	75·5	81·8	101·5	101·254	85·299	75·1	8·94	108·3	100·278	101·991	75·3	85·7	104·9	25–35
35–45 - -	139·351	130·520	93·9	92·8	130·9	114·416	99·283	92·8	9·98	129·3	126·883	114·901	93·4	96·4	130·1	35–45

* Würdigung der Vortheile der Kuhpockenimpfung, von Dr. Reiter, p. 40; and Die Vaccination und ihre neuesten Gegner, von Dr. Haeser, p. 32.

† "Under the mastick-tree" and "under the holm-tree" were the small but sufficient discrepancies of two famous accusers; and this case is recalled to one's mind, as one finds that the theories which charge vaccination with destructive results differ as to the diseases by which it kills. "Les maladies du poumon n'ont pas eu de part "sensible à l'accroissement de la mortalité de la jeunesse," is the result of M. Carnot's arithmetic. "Le vaccin a "corrodé les poumons" is among the impudent invectives of M. Verdé de Lisle. To the former accuser, croup is among the diseases which have diminished; while to the latter (who will admit no gleam of hope for mankind) it is among those which are "presque généralisés par le vaccin."

But the question whether vaccination, in rendering persons less susceptible of small-pox, renders them more susceptible of any other disease, is one of pathological interest, and one which may reasonably be considered.

To a great extent it is already answered, and especially so in a practical sense. The preceding statistics having shown you for the present century frequent instances of large reduction in general death-rates, with improvements in the expectation of life at all ages, it becomes comparatively unimportant to consider whether this or that disease contributes more or less to the diminished total. But there are two special classes of disease to which it is well to advert; because, respecting them, some random assertions have been made, that they, since the introduction of vaccination, have become more numerous.

Scrofula and fever.

I refer first to what are called *scrofulous affections*—including that terrible scourge of human life, pulmonary consumption, or phthisis; secondly, to *continued fevers*, and especially to that kind or variety (typhoid fever) in which certain glands of the intestinal canal undergo a characteristic inflammation.

Sources of fallacy in comparing past and present diseases.

It will be obvious to you that the comparison of present with past diseases is one extraordinarily liable to fallacy. Names of disease are constantly varying: not only because the language of physic changes with the general language of the country; but more especially because, as the anatomical and chemical knowledge of disease is extended, nomenclature becomes more precise, and maladies which had been lumped together under one undescriptive name get their several distinctive titles. Instead of troubling you with medical instances of this very notorious fact, I may remind you that zoology and botany and chemistry illustrate the same process. This may be seen in comparing our scientific lexicons with those of the last century, and observing that animals and plants, and chemical elements and compounds, have "increased since the practice of vaccination," simply because the study of nature has not stood still since the age of Linnæus, Buffon, and Scheele. Later science has added facts to their inventory, has recognized old affinities in another light, and broken into new parcels the former groups of premature classification. So it has been with diseases: our increased vocabulary has been in proportion to the great scientific progress of the last thirty years; it denotes that *more distinctive enumeration of disease by anatomical or chemical characters* which is due to the labour of Laennec and Louis, and Rokitansky and Bright, and innumerable others who have developed these studies of medicine.

Statistics of the subject.

Therefore I cannot refer to statistics with entire facility. But, taking such as can be found, you will notice that all their evidence points one way.

London.

The two annexed tables (to which I have already referred) furnish the means of comparison as regards London. The former of them gives the abstract of Dr. Greenhow's investigation: the latter is the work of Dr. Farr. As you glance below at the names of disease transcribed from the old Bills of Mortality, and as you read the notes to Dr. Greenhow's table in the Appendix (p. 29) you will appreciate the difficulty to which I just referred. Both tables have been constructed with due regard to those sources of fallacy; and it seems impossible to examine their details without being satisfied on the matter in hand.

DATE.	GENERAL and DIFFERENTIAL ANNUAL DEATH-RATES in LONDON per 100.000 LIVING at THREE DIFFERENT PERIODS during the 175 YEARS 1681-1855.					
	From all Causes.	From Small-pox.	From Pulmonary Affections		From Fevers.	From Strumous diseases.
			Including Pneumonia.	Exclusive of Pneumonia.		
1681–90	4210	313·9	693	693	633	80 1
1746–55	3550	304·4	734	734	539	1099
1846–55	2490	33·8	682	528	385	206

Fever.

First, with regard to fever:—Dr. Greenhow, throwing into one group all those deaths of the present day which might have been included under the old application of the word "fever" (counting scarlet-fever and inflammation of the brain, and inflammation of the lungs in this category) still finds that, even with this large addition, the so-called "fever" of the present day occasions only a death-rate of 385 per 100,000, whereas a century ago its death-rate was close on 539. And Dr. Farr, in commenting on the somewhat similar materials which he contributed to McCulloch's work, remarks, without reference to any controversial point, that "fever has progressively subsided since 1771;" and that the combined mortality of small-pox, measles, and scarlatina is now "only half as great as the mortality formerly occasioned by small-pox alone."

General and Differential Annual Death-Rates in London per 100,000 Living at Seven Different Periods during the 226 Years 1629-1854.

Causes of Death.	Bills of Mortality.						Registration Returns. (Dr. Guy.)
	1629–35	1660–79*	1728-57	1771–80	1801–10	1831–5	1840–54
Small-pox - -	189	417	426	502	204	83	40
Measles - -	16	47	37	48	94	86	58
Scarlet fever -	?	?	?	?	?	53	90
Fever - -	636	785	785	621	264	111	101
Spotted Fever - -	45	90					
Plague - -	125	1225	—	—	—	—	—
Dysentery - -	221	894	50	17	1	1	9
Surfeit or cholera -	63	148	1	?	?	135	78
Pleurisy - -	14	6	10	5	4	39	6
Asthma and tisick -	?	?	112	85	89	136	45
Consumption -	1021	1255	905	1121	716	567	323
King's evil, scrofula -	14	19	5	5	?	3	12
Dropsy - -	146	349	218	225	131	133	59
Apoplexy and suddenly	47	30	48	55	49	59	81
Palsy and lethargy -	14	17	12	18	19	28	46
Old age, bedridden -	370	388	415	324	241	357	130
Casualties - -	65	76	85	70	40	57	77
Childbed and miscarriages - -	80	100	43	47	32	43	19
Chrisomes, overlaid, convulsions, worms, teething, mold-shot head, dropsy on the head, inflammation of brain, rickets, liver-grown, canker, thrush, croup, hooping-cough - -	1681	1591	1827	1682	789	625	1314
Inflammation - -	?	?	10	31	101	307	
Unknown causes -	?	?	?	?	?	88	
Other diseases -	253	565	211	144	146	289	
All Causes - -	5000	8000	5200	5000	2920	3200	2488

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* That death-rate of 8 per cent., the average for London during the twenty years succeeding the Restoration, may have been in Mr. Macaulay's mind when he wrote a beautiful passage in his history (end of Chapter III.) criticising the delusion "which leads men to over-rate the happiness of preceding generations." "It is now (he says) the "fashion to place the golden age of England in times when noblemen were destitute of comforts, the want of which "would be intolerable to a modern footman; when farmers and shopkeepers breakfasted on loaves the very sight "of which would raise a riot in a modern workhouse; when men died faster in the purest country air than they now "die in the most pestilential lanes of our towns, and *when men died faster in the lanes of our towns than they now "die on the coast of Guiana.*" According to M. Carnot there ought to have been very little natural small-pox in those days. What say our diarists of London life? In the pages of Pepys and Evelyn there are many references to small-pox; from 1660—when "in the midst of all this joy and jubilee, the Duke of Gloucester died of it in the prime of youth, and a prince of extraordinary promise"—to January 1695, when (the disease having already raged for two months, and the queen having died of it) "the deaths by small-pox increased to five hundred more than in the preceding week;" and perhaps the strongest expression occurs in the very middle of that period when other diseases were so fatal. In 1668 (Feb. 9) Pepys writes, "and among other things, if I have not already set it down, it hardly "ever was remembered for such a season for the small-pox as these last two months have been; people being seen all "up and down the streets newly come out after the small-pox." It was in 1685 that Evelyn (as he relates "in bitterness of sorrow and reluctancy of a tender parent") lost his own daughter by the disease.

Scrofula. Consumption.

So again, says Dr. Greenhow, with scrofulous affections. Exclude phthisis from the comparison (because of the formerly imperfect means of recognizing its presence) and the scrofulous death-rate per 100,000, which in 1681-90 was 801, and in 1746-55 was nearly 1099, is now but 206; so that, looking to the middle of the last century,—the golden age of the vaccino-phobists,—we find a *scrofulous death-rate more than five times as great as our present one.* And then trying by a different process to estimate the former fatality of phthisis—examining, namely, for the three periods compared what deaths have been attributed to diseases of the respiratory organs—we find that, even with the utmost amplification of this list (including pneumonia, which formerly may have been counted to "fever," and including respiratory affections of infancy, which would formerly have been counted to "chrisomes," and including similar affections of advanced life which would formerly have been counted to "old age") still *the pulmonary death-rate of the present time is seven per cent. lower than the pulmonary death-rate of* 1746-55. Dr. Farr's conclusions quite confirm the tendency of Dr. Greenhow's evidence; and he remarks, as the general result of his inquiry, that "the proportion of persons "destroyed by consumption with other forms of " scrofula, has (except in the anomalous period 1771-80) progressively declined in London."

Circumstantial inquiry in particular cases fatal to M. Carnot's theory.

As regards more detailed statistical inquiries—such, namely, as depend on the minute examination of particular cases—it may be observed that there has never been adduced a tittle of evidence to show that vaccinated individuals suffer more than non-vaccinated individuals from any ailment whatsoever. On the contrary, where such inquiries have been made, they have distinctly refuted the supposition.*

As soon as M. Carnot's assertions were made public—as soon as he had committed himself to a statement† that typhoid fever was to be considered as the vaccinational substitute for small-pox, there was something definite for the physicians of France to investigate. They proceeded to do so. They did not shelter themselves under any general arguments. They did not confine themselves to saying to M. Carnot, that where he had found a new disease there was really but a new name. They did not superciliously refer him to common text-books of medicine from which he might learn, what were the ravages of typhoid fever—under other names—long before the discovery of vaccination. But with a candour and humility which did them honour, they accepted the medical hint of their arithmetical opponent,

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* In the year 1814 Mr. Macgregor, then Surgeon to the Royal Military Asylum at Chelsea, published (Med. Chi. Transact. Vol. v.) an account of observations which he had made in that establishment during the ten preceding years in order to ascertain "whether measles, hooping cough, and scarlet fever had been more fatal and severe in the chil- " dren, male and female, that had undergone vaccination, than in those that had been subjected to the casual or " inoculated small-pox." Of children in the latter category there had been 1550; among whom had occurred 420 cases of measles, hooping cough, and scarlet fever, leading to 19 deaths. Of children in the former category there had been 891; among whom there had been 239 cases of the same diseases, leading to 9 deaths. The fatality of these diseases, then, to such as they attacked was 1 in 22 among the variolated class; 1 in 26½ among the vaccinated class; so that what difference existed was in favour of the latter.

† In this doctrine M. Carnot has found two adherents, whose works require no distinctive notice; viz., M. Ancelon, who has written "des transformations des fièvres essentielles dont le cowpox est la cause," and M. Bayard, who has communicated similar crudities to the Academy of Sciences. The following passage from the *Comptes Rendus* of this body (Feb. 10, 1851) may be conveniently quoted, as expressing in a succinct form those doctrines of which my text shows the refutation:—" M. Bayard, dans cette nouvelle note, présente une série de propositions se rattachant " toutes plus ou moins directement à cette idée déjà soutenue par lui dans ses précédentes communications, que la " maladie désignée sous le nom de fièvre typhoïde n'est qu'une variole interne attaquant les individus que la vaccine a " préservé, dans leur jeune âge, de la variole avec éruption externe. De ces douze nouvelles propositions, nous nous " contenterons de reproduire les deux suivantes. XI. La variole confluente et la fièvre typhoïde ne sont, très- " probablement, qu'une seule et même maladie, externe dans un cas, interne dans l'autre, produite par la combinaison " du typhus et de la variole. XII. L'inoculation du virus varioleux dans l'enfance préserve le sujet inoculé des " complications, souvent mortelles, dues à la combinaison de la variole avec les causes morbides intercurrentes."

Summary of results of detailed investigation.

and set to work on the subject. And with what result? Why, that as fast as facts could be collected, the facts refuted him;* that the typhoid infection was observed not only to pay no

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* For instance, in the Report for 1852 of the Vaccination Board of the Department of the Rhone, Dr. Roy, of Lyons, writes as follows:—"Une jeune fille varioleuse avec taches ecchymotiques entrée au mois d'Octobre dans notre "service, succomba dans les vingt-quatre heures qui suivirent son entrée. Trois jours après, deux malades con-"valescentes de fièvre typhoïde sont prises de variole: une d'elles a succombé. Nous avons observé deux cas de "fièvre typhoïde chez des ouvrières qui portaient des cicatrices nombreuses de variole antérieure."

And again, the Report for 1853 of the same Board, besides other references, quotes these cases from Dr. Piérou:—"Dans une maison, les six personnes qui l'habitaient ont eu, en 1853, la fièvre typhoïde; sur ce nombre, "deux avaient eu antérieurement une variole confluente, ce qui n'empêcha pas la fièvre typhoïde d'être aussi grave que "chez les personnes vaccinées. Un homme de 48 ans, soignant son fils vacciné, atteint de fièvre typhoïde, et portant "lui-même des traces de variole confluente antérieure, a eu la même fièvre que son fils; tandis que sa femme, bien "vaccinée, en fut exempte, quoiqu'elle eût soigné son fils et son mari, passant les nuits près d'eux pendant près de "deux mois. Enfin, M. Piérou cite encore deux femmes avec cicatrices varioliques nombreuses atteintes plus tard "de la fièvre typhoïde."

Subjoined to the latter Report is a paper, which had recently been communicated to the Académie de Médecine of Lyons, by Dr. Teissier, Physician of the Hôtel Dieu; telling that among 170 cases of typhoid fever which, during the past eighteen months, had been under his treatment, there were 30 where the patient bore marks of previous small-pox; and adding, that within the same period he had seen more than 20 illustrations of small-pox attacking persons who had previously had typhoid fever; two of whom were at that moment still in his ward, having been seized with the former disease when just convalescing from the latter.

The Paris Academy, in its Report for 1852, speaks of interminable facts of the same sort, specifying only a few of them:—"M. Barth a vue, dans son service à l'hôpital Beaujon, quatre cas de fièvre typhoïde sur des sujets non "vaccinés, et marqués de la petite vérole. Un seul est mort; c'était justement le plus marqué. Et l'inverse, il a "vu encore plus souvent la petite vérole après la fièvre typhoide . . . . . M. le Docteur Lasnon a raconté "qu'appelé dans le cours d'une épidemie, pour voir quatre enfans de la même famille, il eut la douleur de voir "périr les deux garçons, âgés de 25 à 26 ans; les deux sœurs s'en tirèrent, mais elles ne se relevèrent de la petite "vérole que pour mourir plus tard de la fièvre typhoïde . . . . Un honorable académicien a trouvé dans un seul "rapport dix-sept cas de fièvre typhoïde, dont neuf sur des sujets qui avaient eu la variole naturelle."

In the Gazette Médicale de Paris, 1854 (p. 530) Dr. Thore writes a paper, in which, besides quoting similar cases from several other authorities, he details from his own experience, as follows: first, 8 cases of typhoid fever, sometimes of great severity, following small-pox in non-vaccinated persons aged from 19 to 51; and secondly, 6 cases of small-pox, modified and unmodified, following typhoid fever in vaccinated and non-vaccinated persons aged from 9 to 20. Dr. Thore appropriately quotes Stoll's information about fever in Vienna in the last century, to the effect that, during a period of 12 years, about two fifths of all Vienna deaths were produced by it, and that it proved fatal to nearly one seventh of all whom it attacked.

Professor Forget, of Strasburg, had published in 1852 (Gaz. des Hôpit. p. 79) an important memoir, discussing the question on general pathological grounds, and giving cases in support of his opinion. He institutes an extended comparison of the two diseases, as to their respective anatomical affinities and the nature of their morbid processes, and the symptoms (especially the relation of the fever to the local changes) of each. He argues that "l'apparence "pustuleuse de la dothinentérie est exceptionelle et ne constitue qu'une forme assez rare;" and he concludes, "(1) que la comparaison entre les deux maladies n'est pas soutenable; (2) que l'enterite folliculeuse ne préserve pas "de la variole; et (3) que l'une pouvant succéder immédiatement à l'autre et vice versâ, c'est le comble de l'incon-"sequence que d'établie entre ces deux affections une solidarité que rien ne justifie."

A careful description by M. Blot, communicated to the Société de Biologie (Gaz. Méd. 1854, p. 731), illustrates this further point; that when, rarely enough, small-pox does develop pustules along the intestinal canal, these differ essentially in their distribution and character from that affection of a specific glandular structure, which is characteristic of typhoid fever. It is remarkable, too, that in M. Blot's case not even M. Carnot could have regarded the intestinal pustules as *la variole détournée par la vaccine:* for never had patient been so little vaccinated: the intestines were those of a *fœtus;* the mother herself, not vaccinated, had had modified small-pox; and the intra-uterine child had thus contracted small-pox, died, and been expelled. In addition to an abundant variolous eruption on the skin there were great numbers of pustules in the stomach, and all along the small intestine at every part of its circumference.

In *Canstatt's Jahresbericht* for 1851 I read of a paper by Dr. Debourge (published in the Brussels *Journal de Médecine*, Nov. 1851) answering M. Carnot with the following illustration:—A village in M. Debourge's neighbourhood had been visited by typhoid fever so severely, that almost the whole population—especially that part which was special regard to the unvaccinated, but even to attack persons in the very hour of their emergence from small-pox; that, conversely, small-pox would attack others in their actual convalescence from typhoid fever; that to have had the one disease, or to have escaped it, made absolutely no difference to having the other disease or escaping it; susceptibility to the one infection standing in no discoverable relation towards susceptibility to the other; and vaccination having no more to do with typhoid fever than with any other casualty of life which befalls vaccinated and unvaccinated alike.

Second class of facts fatal to M. Carnot's theory.

Apart from these demonstrations, a second great series of facts, observed for the last fifty years, is conclusive against M. Carnot's imagination.

What happens when vaccinated persons are exposed to variolous infection.

When masses of vaccinated persons are exposed to the infection of small-pox, if some of them suffer, do they suffer typhoid fever or any intestinal ulceration, inflammation, or disturbance? Here is exactly M. Carnot's postulate, small-pox infection acting on the vaccinated body: and the result is among the most extensively and most accurately observed phenomena of clinical medicine. In it there is the utmost possible refutation of M. Carnot. On his showing, there should be typhoid fever. In fact, there is nothing like it. Under the happy influence of Jenner's discovery, the small-pox is mitigated, perhaps almost to nothing. A few pustules, rapidly drying up, may alone attest that the once dreadful enemy is working in vain against a protected body. Of typhoid fever, of intestinal complication, of any other like disturbance, there is literally not a trace. But, just in proportion as the pustules are few, just in proportion as the protectedness against small-pox has been all but complete, so—in diametrical contrast to M. Carnot's notion—the other sufferings of the patient will be slight, and his convalescence rapid.

Sanitary experience of the real causes of typhoid fever.

It may further be observed, that investigations made in this country have established among the certainties of medicine that typhoid fever mainly depends on causes quite remote from the causes of small-pox. And in respect of those districts or institutions in France where this disease is said to decimate the inhabitants, I will venture to affirm, as confidently as if I had visited the localities, that any qualified person inquiring into the *diet and atmosphere* of such populations, especially into their drinking-water, drainage, and domestic arrangements for cleanliness and ventilation, would be able readily to explain from local circumstances, and almost as readily to obviate by local improvements, any such specific mortality as M. Carnot alleges to exist.

Scrofulous affections.

As regards the second class of diseases to which special reference has been made—the scrofulous or tubercular class—the pathological argument is at least equally applicable. The causes of such diseases are radically different from the causes of small-pox. To talk of such diseases being the vaccinational varieties or introversions of small-pox—to talk of their promising to be developed in proportion as small-pox becomes suppressed—is simply to talk at random.

What is meant by scrofula.

There are two scientific senses in which the word *scrofulous* is used: first (somewhat indefinitely) in reference to certain sub-acute and chronic *inflammations*, often of an ulcerative kind, which arise, generally with little or no exterior provocation, in various textures of feeble and ill-nourished persons; secondly and more strictly, in reference to a specific constitutional weakness, which more or less disqualifies the circulating juices of the body from ripening to their natural pattern, and disposes them to such modification of development as results in their partial solidification and concretion into *tubercles* of dead material.

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between 20 and 40 years of age—had suffered. Four years afterwards, small-pox prevailed there (nearly the whole population being unvaccinated) and attacked and killed indiscriminately those who had, and those who had not, suffered from the typhoid infection.

Scrofula without tubercles.

Its real causes.

Scrofula in the first-mentioned sense is not independent of hereditary influences; but its principal causes have to do with the mere keeping and feeding of the individual sufferer. Scientific experiments can produce it in the brute creation; and unintentional experiments on millions of mankind have shown, on an awful scale, how mere an index it is of bodily depression—how sadly it is the sequel of poverty and privation—how constantly it goes with grief and hunger and squalid uncleanliness, with exhausting toil and monotonous imprisonment.

Vaccination a powerful indirect influence against it.

It would be difficult, therefore, to conceive against vaccination a charge more ludicrously inapplicable, than that it has tended to aggravate diseases which are essentially the diseases of debility. For if you compare the extreme degree in which natural small-pox weakens and exhausts those whom it refrains from killing, with the contrary and entire absence of such results among the ordinary effects of vaccination, you have in this comparison a measure of the important influence which Jenner's discovery has exerted—not in aggravating, but—in mitigating the diseases in question.

Scrofula with tubercles. Phthisis.

Its real causes.

Scrofula—in that second-mentioned and more definite sense which restricts it to pulmonary consumption and other tubercular affections—eminently tends to be an hereditary disease. In persons hereditarily predisposed to it, some circumstances will very much promote, other circumstances will very much impede, its manifestation. But the root of the disease lies beyond very immediate contact with exterior conditions. It lies in those *laws of development* under which the chemical changes of the body, like its growth of stature and of features, are made conformable to a particular parental type; it belongs to the family-likeness between parent and child; it forms part of a definite entail. So little does it stand in any apparent connexion with vaccination, that—on the contrary—it even shows marked preference for those very periods of life, when the protective influence of infantine vaccination has often partially become obliterated.

What then do those writers mean who talk of tubercular diseases being made more frequent by vaccination? Do they mean that vaccination *propagates* from one person to another the developmental peculiarity which I have described? They might as well say, it communicates a roman nose or a landed estate. Do they mean that in persons or families there is evidence of an *inverse proportion* between small-pox and tubercular diseases? Nothing of the kind exists. Do they mean that such ingredients of the skin as constitute its susceptibility to small-pox are *transmutable* into those elements of blood and lymph which, in scrofulous persons, are blighted into the characteristic substance of tubercle? All known facts and analogies tell to the contrary. Or do they mean, comparatively speaking, that vaccination belongs to the *circumstances which promote*, and small-pox to the circumstances which impede, the manifestation of the hereditary tendency? Again I say, only let them read the history of small-pox. In respect of these tubercular affections, as of the mere scrofulous inflammations previously discussed, let them note that, among recognized developing conditions of both classes of disease, *impoverishing and depressing influences* hold, by common consent, the most considerable place;* that, so far as we know, it is only as an impoverishing and

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* Monsieur d'Espine, of Geneva, has attempted to measure, with some degree of statistic precision, the influence of poverty in producing certain diseases. He says:—"Les décès par vice scrofuleux forment le $\frac{21}{1000}$ des décès déterminés dans la mortalité générale, le $\frac{6}{1000}$ des décès des riches, et le $\frac{34}{1000}$ des décès des pauvres. La prédisposition scrofuleuse chez les pauvres est ici aussi frappante que l'influence préservatrice de l'aisance. Les décès par vice tuberculeux entrent pour les $\frac{155}{1000}$ dans les decès déterminés de la mortalité générale, tandis que chez les riches il n'y a que 68 décès pour 1,000 qui se rapportent aux tubercules; chez les pauvres, on en compte 233 pour 1,000. Ici encore on trouve une influence très prédisposante de la misère et une action préservatrice de l'aisance."—Annales d'Hygiène Publique, t. xxxviii.

Vaccination indirectly preventive of tubercular, as of non-tubercular, scrofula.*

depressing influence that either small-pox or vaccination can be imagined to operate; that all writers on small-pox attest the frequency with which scrofulous affections follow in its train; and that in such measure as vaccination is less impoverishing and less depressing than small-pox, in just such measure does its substitution for small-pox act in prevention of scrofula.

Summary of results on the morbid liabilities of vaccinated persons.

So far, then, as regards properly-performed vaccination, there is absolutely no reason to believe or suspect that, in rendering persons less liable to contract small-pox, it renders them eventually more liable to contract other diseases. Neither in speculative pathology, nor in common practice, is there the slightest semblance of support for any such doctrine. It ranks with the old misgiving, that vaccination would make horns grow and cover the body with cow-hair. Those who would have believed the one may believe the other.

What does vaccination really do to the human body?

Is properly-performed vaccination, then, an absolutely inoffensive proceeding? Not at all, nor does it pretend to be so. The very meaning of the thing is, that it shall artificially and designedly produce a transient and trifling indisposition; that for some days the infant shall be uncomfortable with a sore arm and a slight irritation of the adjacent axillary glands, and a perceptible amount of general feverishness. Within the limits of this description, one child may be a little more, another a little less, inconvenienced: but those limits are rarely exceeded. And if it cannot strictly be said that the immediate effects of well-performed vaccination *never* exceed the intentions of the vaccinator, at least it may be affirmed that any permanent injury resulting from it is an accident barely known in the practice of surgery.

Does vaccination cause cutaneous eruptions and glandular swellings?

Persons hostile to vaccination allege against it, that it produces eruptions on the skin and glandular swellings: and others, not unfavourable to the practice, doubt whether this may not to some extent (and especially as regards unhealthily-predisposed scrofulous children) be a true allegation.

Vaccination might afford to bear these imputations. For, to what do they amount? Were they ever so true, the alleged evil—even to the sufferer—would be little in comparison with his gain; and the total amount of such evils, compared to the social advantages of vaccination, would, literally speaking, be too small to appreciate.

Circumstances under which these disorders occur.

But, in fact, the imputation is—at least generally—erroneous. There is in it again that common fallacy of calling whatever happens to come after an event its effect. *Propter, quia post.* The infant is commonly vaccinated at three or four months of age.

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* It deserves notice, that this indirect *prevention of scrofulous affections* was among Jenner's hopes when he announced the discovery of vaccination. In various passages of his writings (e. g. op. cit. pp. 60, 116, 181) he refers to the notorious frequency with which such affections were excited by small-pox; and he appeals to general consent as to inoculated small-pox often occasioning them. "In constitutions predisposed to scrofula, how frequently we see the "inoculated small-pox rouse into activity that distressful malady. . . . Every practitioner in medicine who has "extensively inoculated with the small-pox, or who has attended many of those who have had the distemper in the "natural way, must acknowledge that he has frequently seen scrofulous affections, in some form or other, sometimes "rather quickly, showing themselves after the recovery of the patients." It is worth while to remember that these charges were brought against the practice of small-pox inoculation long before the discovery of vaccination; and not only amid the frantic prejudices against its first introduction, but even to the end of the century, when certainly its dangers in this respect must have been greatly diminished by the improved methods of treating inoculated patients. In a pamphlet written between 1793 and 1798 earnestly in defence of inoculation (Advice to Parents on the Management of their Children in the Natural Small-pox and during Inoculation; Newark and London, n. d., p. 3) I find the following passage:—"The propriety of inoculation is confirmed as well by reason as experience; and though some "unfavourable circumstances have happened in the hands of ignorant and illiterate persons; though repeated eruptions "have given rise to the false report of patients having the disease a second time; though the *vis vitæ* of some whose "constitutions were not very strong, and the proper medicines through a want of skill not duly proportioned, has "been injured; though persons with weak lungs have been thrown into pulmonic complaints; yet these contingencies "are by no means to be charged to the method itself."

Thus whatever physical or moral evils belong to human life are very likely to have been preceded by vaccination; and it is not extraordinary that, especially by ignorant persons, this operation should often be charged with producing incredible results. When you consider, too, that the few months after vaccination include events which are very critical to infant life, you will see what frequent room there must be for misconception. Even to the healthiest and best cared for of children, weaning and teething are not perfectly safe and comfortable processes; to delicate and ill-nurtured children they are often fatal; to vast numbers they occasion, sometimes during many months, distressing or alarming symptoms. Such symptoms, I need hardly tell you, affect both vaccinated and unvaccinated. They have been known as incidental to infancy from periods long anterior to Jenner's existence. Now, an extremely frequent one of such symptoms is an inflammation of skin (known by the technical name of *eczema infantile*) producing on the child's head and face, or on other—perhaps many or most—parts of the body a dense eruption of little pimples, which presently convert into an itching and discharging surface so much of the skin as they occupy: and since irritations of the skin are peculiarly apt to propagate themselves in the direction of the return-current of the circulation of blood to certain organs—the so-called *lymphatic or absorbent glands*—which are subsidiary to this circulation, so it very commonly happens that more or less irritation and swelling of these glands will accompany that eczematous eruption; and that, for instance, the child who has the eruption about its head and face (which are among the most usual seats of the unsightly disease) will often be still further disfigured by glandular swellings in the neck. Though I have spoken of this infantile complaint as incident to the time of teething and weaning, yet in fact it may arise at earlier periods of life—even within a few weeks of birth—and of course before vaccination as well as after it. Indeed, frequently it is a reason for which vaccination is postponed; and perhaps I can give you no readier means of estimating how little vaccination has to do with its occurrence, than by telling you, first, that before the discovery of vaccination small-pox inoculation was charged with producing it; and, secondly, that in 1714, when small-pox inoculation was yet unknown in England, Dr. Daniel Turner* expressed himself in the following terms:—" Among diseases of infants " and young children scarce any attends more frequently than pustulary or scabby eruptions " in several parts of their bodies, as in the breech, but more especially their foreheads, brows, " and other parts of the face, which we find oftentimes overrun with dry and crusty " scabs."

Their relation, direct and indirect, to vaccination.

The circumstances under which both infantile eczema and glandular swellings arise are familiarly known to the medical profession. To say that properly-performed vaccination can have *directly* to do with them—that it can directly cause general eczema, or directly affect any glands but those which it is intended and expected to affect—would be an assertion not warranted either by practical experience or by any pathological probability. To say that *indirectly* it may do so—that, in the very few instances where it produces excessive results, the disturbance thus occasioned may, by depressing or fevering the child, temporarily assist or excite other causes of disturbance—that, under such very exceptional circumstances, it may for the time of its operation predispose the child to this complaint and to that, may excite the scrofulous child to show its scrofula, and the eczematous child to show its eczema—these are assertions which, may or may not be true; which are more easily made than either established or refuted; but which, if admitted in their utmost scope, really allege against vaccination nothing which might not as practically be alleged against a cold in the head, a sore finger, an undigested meal, or any other one of the thousand minor accidents of every-day life.

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* Treatise on Diseases of the Skin, p. 44, where the references given by Turner extend back to Galen.

So much for what has been alleged against properly-performed vaccination—against such vaccination as alone ought to prevail in any country where the State requires its performance. So much for the drawbacks which have falsely been said to detract from its inestimable advantages, and the dangers which with almost equal falsehood have been said to attend its performance.

Ill-performed vaccination.

It is less easy and less necessary to dispose of what may be said against ill-performed vaccination; understanding in this phrase not merely such vaccination as is done with an unskilful hand—for commonly the worst effect of clumsiness is only that the operation fails; but especially referring to such vaccination as is done without due inquiry into *the health of the child* to be vaccinated, or without due care for *the quality of lymph* to be employed.

[illegible]

If local scandals have arisen against vaccination, and if some prejudices against it seem to have in them a show of reason, those are the sources from which such serious evils have come. All that belongs to the mere manual trick of vaccination is learnt from a minute's teaching and an hour's practice; but not so easily the philosophy of the procedure, or the precautions which are requisite to make it harmless and useful. From Jenner onward, all great masters of vaccination have urged that its merits will always appear proportionate to the merits of its performers; that if sickly children are vaccinated without due regard to their actual condition of health—children breeding other disorders—children having skin-disease—children teething—and the like; or if children, healthy or unhealthy, are vaccinated with improper material, the results must be at least unsatisfactory, and possibly dangerous. And all competent persons accordingly recognize that one who would vaccinate must thoroughly study these things.

especially as to source of lymph.

Especially as regards the quality of vaccine lymph, the careless or uneducated vaccinator is using a dangerous weapon. It is only during part of the course of a vaccine vesicle that its lymph is suitable for further vaccinations: for after a given moment, at which the contents of the vesicle possess their maximum of simple contagiousness, they tend more and more towards the quality of common inflammatory products; and matter now taken from the vesicle is no longer the simple agent of a specific infection, but both has less efficiency for its real purpose, and is specially able to produce other undesired results. A danger of somewhat similar kind is that of taking lymph from vesicles which already have been accidentally ruptured, or where from any other cause—local or constitutional—their specific fluid is likely to have been modified by common irritative processes. Still more critical changes occur in lymph when removed from the body, unless appropriate means be taken to preserve it; for, under the influence of air and moisture, it tends, like other dead organic matter, to putrid decomposition; and inoculation with it, when thus changing, can hardly be more useful or less dangerous than a casual scratch inflicted in the dissecting room. According to the usual practice of vaccination, error is less likely to be committed in this particular than in the one first mentioned; for, when the operation is not performed from arm to arm, use is very generally made of lancets or ivory points, on which lymph has been allowed to dry. Under this system (at least in our climate) the matter is almost secure from change; and there is little room for such accidents as might arise from failure in those delicate procedures by which lymph is sometimes kept moist for use. But the danger of taking matter from irritated vesicles, and from vesicles at too advanced a period of their course, is one which circumstances render frequent; and there is reason to believe that, in at least a very large proportion of those cases where abnormal effects have resulted from so-called vaccination, it has been the employment of this ambiguous irritative matter which has occasioned the mischief and scandal.

Can accidental infections occur in vaccination?

Suspicions are sometimes expressed that a slovenly vaccinator, careless in his choice of lymph, may thus communicate to one child the constitutional or local diseases of another. If this were true, it were nothing against vaccination. It is no argument against bread, that alum constipates the bowels; still less is it an argument against quinine, that some drunken shop-boy may give one strychnia instead of it. And, without intending disrespect to gentlemen whose opinions on this point may be less decided than my own, I must say that I believe it to be utterly impossible, except under circumstances of gross and punishable misconduct, for any other infection than that of cow-pox to be communicated in what pretends to be the performance of vaccination. A vaccinator must forget his duty in more than one particular—he must be indifferent both to the feelings of others, and to the social progress of the great good which he claims to administer, if he affronts the natural antipathies of those who bring their children to be vaccinated, by drawing his lymph for vaccination from the vesicles of diseased subjects. And, practically speaking, I can conceive no circumstances in this country which would justify a departure from the rule—recognized by the medical profession as unreservedly as it is desired by the public—that lymph be taken only from healthy subjects.

Opportunity of testing it ought in fact never to occur.

But, supposing that, in breach of this rule, lymph be taken from the Jennerian vesicle on the arm of a subject suffering constitutional disease—what then? *On the assumption only that it be a true Jennerian vesicle at the proper period of its development,* there are cogent reasons for believing that such vaccination can produce none but normal results.

Vaccine lymph from persons suffering small-pox.

There is one simple mass of experience which, to my mind, seems conclusive. It has been proved on a large scale that vaccine lymph, taken from persons actually suffering small-pox, conveys to those who are vaccinated with it no other than the vaccine infection. This most remarkable truth has been established, I say, on a large scale; for, not once or twice, but at least hundreds of times, something to the following effect has occurred. A patient has been vaccinated a little too late for protection. He had previously been exposed to an atmosphere infected with small-pox. Warned of his danger he has had recourse to vaccination when already small-pox was latent in his system; and (under a law which expresses the intimate affinity of these two agents) the operation of the inhaled variolous contagion, and the operation of the inoculated vaccine contagion, have proceeded simultaneously on his person; the former producing the general disturbance and general eruption of small-pox; the latter producing, at the vaccinated spots, characteristic Jennerian vesicles. And with the lymph of these vesicles, again and again, successful vaccination has been performed. Again and again it has been shown that such lymph is capable only of communicating the Jennerian infection.

Extension of this analogy.

Since then it is a quite unquestionable certainty that, even when the system is drenched with that subtlest infection of small-pox, the Jennerian vesicle preserves its own contagion pure and isolated, the argument may reasonably be extended. And, even if there were no evidence in relation to other diseases, this analogy would have rendered it eminently improbable that any, the most infectious, of their number could admix its contagion with the specific products of cow-pox. Indeed, so definitely and so constantly characterized are those local changes which different morbid poisons severally and specifically produce, that to say of a given phenomenon "this is a typical Jennerian vesicle" is, I believe, tantamount to saying "this is a vesicle, which only one unmodified influence can produce, which no second "influence can concur in producing, and in the contagion of which no second principle of "infection can possibly reside."

Maladies which are alleged to have been communicated by vaccination.

Turning, however, from these general considerations, I may inform you that the diseases which it has been suspected that vaccination might communicate have chiefly been scrofulous and syphilitic complaints, and various eruptions of the skin. In all but a very limited number of these cases it may be conclusively answered that the suspected mischief is physically impossible. Scrofula, for instance, and most skin diseases—even when, for experiment, their specific discharges and other products are deliberately inoculated on the healthy—are absolutely incommunicable by contagion; and it is inconceivable that the vaccine lymph, even if it could include these products, would alter the essential condition of their nature. Of some others among the diseases referred to, it may no doubt be admitted that certain of their specific products are infectious; but then again comes the question (which is already by anticipation almost disposed of) whether the constitutional existence of such diseases can qualify the contents *without modifying the characteristic development* of a true Jennerian vesicle.

Experiments on the subject.

Experiment, where it has been deliberately addressed to the solution of this question, has invariably answered *No;* and such experiment is worth more than many arguments.

M. Taupin.

The early Reports[*] of the French Academy contain numerous particulars on this interesting subject; but observations on the largest scale appear to have been made by M. Taupin during his residence as medical officer in the Paris Hospital for Sick Children; and Messieurs Blache and Guersant, Physician and Surgeon to this Institution, having occasion to discuss the general question, have included an account of M. Taupin's experiments in a passage which altogether is of so much importance that I transcribe it at length from their paper.[†]

“ Le virus vaccin ne paraît pas s'allier avec d'autres virus: lorsqu'on inocule un mélange de virus
“ vaccin et de varioleux, on n'a qu'une de ces maladies, ou, si elles se développent toutes les deux ensemble,
“ elles marchent chacune séparément avec le caractère qui lui est propre. Dans un très-grand nombre
“ d'expériences tentée par le comité de vaccine ou par ses correspondants, on a pris du vaccin sur des pustules
“ vaccinales développées à dessein au milieu de dartres, d'ulcères scrofuleux, de teigne favus, de vésicules de
“ gale: on n'a remarqué que la vaccine sans aucun mélange de gale ou d'autres maladies. De nombreuses
“ expériences sur ce sujet ont été répétées par la Docteur Taupin, à l'Hôpital des Enfants Malades. Nous
“ empruntons ce qui suit à un mémoire inédit sur la vaccine, et qu'il a eu l'obligeance de nous communiquer.

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[*] Rapports présentés à M. le Ministre de l'Intérieur par l'Académie Royale de Médecine sur les Vaccinations pratiquées en France. From four of these Reports I extract the following paragraphs:—(Rapport 1808-9., pp. 54, 55.)
“ M. Pellieux, médecin à Baugency, nous a paru avoir fait l'expérience la plus concluante en inoculant le vaccin
“ d'un sujet varioleux à vingt-trois sujets qui ont eu simplement la vaccine. . . . Des sujets dartreux, galeux,
“ teigneux, vénérieux, scrofuleux, ont également fourni à quelques praticiens de la matière vaccinale, dont l'inocula-
“ tion a produit son effet ordinaire sans donner la moindre marque de la maladie dont les enfans étaient attaqués.
(Rapport 1821-22, p. 41.) “ Quelques personnes peu éclairées répugnent encore à faire vacciner leurs enfans
“ parcequ'elles supposent que les maladies des individus qui fournissent la matière, peuvent se transmettre par l'inter-
“ médiaire de la vaccine aux sujets sur lesquels on l'inocule. Cette crainte, détruite dans nos premières expériences
“ et toujours combattue depuis cette époque, l'a été de nouveau par plusieurs de nos correspondans. Ainsi M. Rochot,
“ médecin à Seurre, a vacciné dans un village du département de la Côte d'Or un enfant de six mois, dont la mère était
“ atteinte du mal vénérien, et qui lui même avait quelques pustules au front. Il inocula le vaccin de cet enfant à plusieurs
“ autres sur lesquels la vaccine se développa sans aucune complication d'affection syphilitique. M. Debar, médecin à
“ Rue, a fait la même expérience, et avec le même succès. M. Voisin, officier de santé à Solignac, a inoculé le vaccin
“ d'un sujet galeux sans donner la gale. Enfin, M. Labesque a inoculé quatre personnes avec du vaccin provenant
“ d'un sujet qui était en pleine suppuration de petite vérole et la vaccine s'est développée seule.” (Rapport 1829,
p. 15.) “ On sait depuis longtemps que le virus vaccin ne se charge d'aucun principe contagieux. Cette année
“ plusieurs médecins, parmi lesquels se trouve M. Boucher de Versailles, l'ont inoculé après l'avoir puisé chez des
“ varioleux qui avaient à la fois la variole et la vaccine, et n'ont donné que cette dernière maladie.” (Rapport 1834,
p. 45.) Le virus vaccin ne communique et ne développe que la vaccine.

[†] Dictionnaire de Médecine (seconde édition) art. *Vaccine.*

" Pendant les quatre années qu'il a passées à cet hôpital, il a sous les yeux des chefs de service vacciné plus
" de deux mille sujets placés dans des conditions différentes d'âge, de santé, &c.; il a suivi et noté avec soin
" le résultat de l'inoculation, et il s'est surtout attaché à observer quelle modification les diverses maladies
" pouvaient faire éprouver à la vaccine, et quelle influence celle-ci pouvait exercer sur elles à son tour. Il a
" pu observer que le vaccin recueilli chez des enfants atteints de maladies aiguës ou chroniques, de fièvres
" essentielles, affection typhoïde, fièvres éruptives, de phlegmasies thoraciques, cérébrales, abdominales, de
" névroses, telles que chorée, hystérie, épilepsie, &c., était tout aussi actif que s'il eût été emprunté à des
" enfants bien portants; qu'il donnait lieu à une vaccine tout aussi abondante et regulière, et qui préservait
" tout aussi efficacement de la variole; et ce qu'il n'importait pas moins d'établir par un nombre considérable
" d'observations, c'est que le virus ne transmettait aucune maladie, soit aigue, soit chronique, contagieuse
" ou non contagieuse. Un grand nombre d'enfants atteints de gale, de scarlatine, de rougeole, de varicelle,
" de varioloïde et de variole, ont fourni un vaccin qui n'a jamais communiqué aucune de ces maladies
" contagieuses. Il en a été de même pour le vaccin pris sur des sujets atteints de rachitis, de scrofules, de
" syphilis, de tubercules, d'éruptions chroniques du cuir chevelu, de dartres, &c. Dans aucun cas, nous y
" insistons à dessein, le virus n'a rien communiqué que la vaccine toute seule. Loin de nous l'idée de
" conclure de cette innocuité qu'on doive employer indifféremment du vaccin pris sur des sujets sains ou
" malades; mais nous voulions rapporter ces faits bien avérés pour faire justice de ce préjugé qui attribue à
" du vaccin malsain les maladies qui surviennent quelquefois chez le sujets vaccinés, longtemps même après
" l'inoculation."

I am not aware of any counter experiments suggesting different conclusions to those which are expressed and justified in the preceding passage. They assert for vaccine lymph the principle which Dr. Mead a century ago asserted for the virus of small-pox inoculation:—" it is more material into what kind of body it be infused, than out of what it be taken."* Indeed in the whole list of diseases, syphilis is the only one to which serious suspicion could attach; and, in regard to its communicability by the lymph of a true Jennerian vesicle, various other observers confirm the accuracy of M. Taupin's results.†

Experiments of Professor Sigmund and Dr. Friedinger.

Moreover Professor Sigmund of Vienna (whose researches on everything relating to the inoculation of syphilis have been on a very large scale) has added to M. Taupin's results one, which, quite in a different manner, is equally against the possible invaccination of syphilis.

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* It deserves mention that these fears about the possible transfer of some unintended contagion belonged to the days of small-pox inoculation, and were then much discussed. In Kirkpatrick's Analysis of Inoculation, mention is made of a case where he tried, with no ill effect, the inoculation of small-pox matter from a syphilitic patient. Dr. Mead (Chap. 5) writes of those who, " infected with an incurable itch of writing and taking great pleasure in " contradicting others to whom they bear envy, . . still go on to terrify us by saying that there is danger lest, " together with the small-pox, some other infection inherent in the blood and humours of the sick person should be " transmitted into the sound body, . . and such perhaps are scrofulous swellings and the venereal disease. Yet I " can hardly believe that it ever happens that the seed of one distemper should bring along with it mixed the " procreative matter of another of a nature quite different from it. . . It is in my opinion more material into " what kind of body the venom be infused than out of what it be taken." It is remarkable, too, that the first opponent of vaccination (Moseley, op. cit. xi.) discusses this point—not in reference to vaccination (against which it had not then been raised) but in reference to small-pox inoculation:—" Suppose a subject in the small-pox to have inveterate " scurvy, scrofula, itch, syphilitic infection, or consumption, certainly no person ought to take matter from such a " person for inoculation. But it might be done with as much safety as if none of these disorders were present. " Peculiar circumstances, which I had no share in creating, have rendered me acquainted with some of these facts, " and accident the others."

† Dr. Heymann (Henke's Zeitsch. 1856, p. 195) quotes some experiments by Dr. Schreier of Ratisbon, which are to the same effect:—" Zwei in hohem Grade syphilitische Kinder geimpft und aus den volkommen entwickelten " Impfblattern die klare Pockenlymphe auf gesunde Kinder übertragen, was nicht den geringsten Nachtheil für die " Geimpften zur Folge hatte;" and he gives some remarkable observations made by himself at Java. Children having scrofula, syphilis, itch, the endemic frambæsia, and other complaints, were used, indifferently with others, as sources of vaccine lymph; and no evidence ever appeared of any disease being thus communicated. This, he says, was especially observable in vaccination performed on the generally clean-skinned and constitutionally sound Chinese, from the Javans, who were so often the opposite.

In an official Report on the division of the Hospital over which he presides (Aerztlicher Bericht des Allgem. Krankenhauses; Wien, 1855) he relates experiments to show that syphilis in its inoculable form prevents, within the sphere of its infection, the simultaneous formation of a vaccine vesicle. The discharge of chancre (in which form alone syphilis is universally recognized to be inoculable) has been designedly mixed—as by nature it never could be mixed—with ordinary vaccine lymph; and the insertion of this compound poison in the skin has been followed only by the ordinary local results of syphilitic infection. No Jennerian vesicle has been formed; no signs have existed of any possible combination of the two infections. Dr. Friedinger, who conducted these important experiments in Professor Sigmund's wards, and under his observation, has also communicated their result to the Society of Surgeons at Vienna.*

Peculiar source of fallacy in cases of alleged invaccination of syphilis.

It is unquestionable, however, that cases are recorded in which the lookers-on (sometimes including a medical practitioner) have believed syphilis to have been communicated by vaccination. A moment's reflection suggests, that in such cases there must generally be sources of fallacy, which render them, in contrast with experimental results, almost valueless for instruction. When a child is born with the heritage of syphilis (a very frequent incident, if its parents have been suffering from that infection) the characteristic symptoms commonly do not appear till some weeks after birth; and then the scandal discloses itself. Now among persons with any sense of shame the knowledge that one had transmitted syphilis to one's child would always be a sore subject. There would be strong temptations to employ false pretexts. Not only would parents often conjointly wish to disguise from their medical attendant, or from members of their household, the real explanation of the child's ailment; but also, not infrequently, one parent would wish to conceal from the other that the origin of the disease had been a conjugal infidelity. In respect even of unmarried people, every surgeon knows what utterly false, far-fetched, and absurd explanations are given of syphilitic symptoms, primary and secondary; and it requires little experience to imagine how much more pertinacious will be the demand for excuses, and how much more active the supply of falsehood, under the complicated circumstances of connubial syphilis. Accordingly it is matter for surprise, that vaccination has not almost generally been pitched upon by persons in search of an apology for their syphilitic children. But in truth even such allegations against it have been few; and their paucity (assuming them all to have been made in good faith) would be a strong reason for regarding them with mistrust;† for surely if syphilis could be diffused by the vaccine lymph of children with an hereditary taint of that disease, this possibility must long ago have been made evident on a scale far too considerable for question.*

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* Abhandl. der Gesellschaft der Aerzte zu Wien, 1854–5.

† Medical sources of fallacy are really too numerous for enumeration. But there is one against which, in my opinion, peculiar caution is required. I have personally reason to know that a simple surgical incision, on a child having latent in it the taint of hereditary syphilis, may become the seat of ulceration, which will present the ordinary characters and require the specific treatment of a secondary syphilitic sore. Some years ago I performed on a little boy, having no apparent ill health, a very trifling surgical operation—that for phimosis. In a few days the incision was, as is usual, all but well. In a few more it had begun to ulcerate. For some weeks there continued in the part an indolent inflammatory process, with considerable swelling, and slow but progressive ulceration. A variety of treatment failed to do good. At length a suspicion occurred to my mind which led me to prescribe iodide of potassium. Within eight-and-forty hours the wound had thoroughly changed its character—every reason for alarm was gone; and within a few days complete healing was accomplished. I now learnt that the child had been born with a strong hereditary taint, and had—long before the operation—required constitutional treatment on account of the usual symptoms of infantine syphilis. I believe, also—but here it is easier to be deceived—that I have seen the same constitutional influence modify a primary syphilitic sore (contracted by an adult already suffering from secondary syphilis) and convert it, at its period of repair, into what had all the characters of secondary syphilitic ulceration. At least I have seen such a sore, after months of unsuccessful treatment, change its character in a few hours, and rapidly advance to healing under the use of iodide of potassium. Now, what certainly happened in the first case with the clean cut of a surgical knife, and probably in the second case with a sore which had been the seat of

Real cases of inoculation of syphilis in pretended vaccination have arisen in a different manner.

Among the scanty number of recorded cases in which such allegations have been made, there are, however, some, in which, so far as I can judge, it seems almost certain that a person pretending to vaccinate did really effect a syphilitic inoculation. Properly to estimate these grievous instances of malpractice, two considerations must be adverted to:—First, to the already quoted negative results obtained by Taupin and many other observers in their experimental inoculations of lymph from the true Jennerian vesicles of syphilitic children; secondly, to the fact that secondary syphilis itself is very possibly not communicable even by direct inoculation of matter from the ulcers and eruptions which it occasions; for many of the ablest experimenters in Europe declare, that in hundreds of trials they have never once succeeded in thus conveying from person to person the slightest infection of syphilis. And, regard being had to these considerations, it becomes almost certain, that in the cases referred to, the matter of chancres—the matter of primary syphilis—was used instead of vaccine lymph by the vaccinator; a mistake (however it may have occurred) of so gross and criminal a nature, that the medical profession would feel no sympathy for the person through whose neglect or incompetence it happened.

Cases where small-pox matter has been unintentionally used in vaccination.

Other illustrations of culpable malpractice in vaccination, though rare, are not unknown. In the French Report (which has just reached us) on the vaccinations of 1854, mention is made of an outbreak of small-pox due to the unintentional employment of variolous matter—instead of vaccine lymph—for inoculation. And I have been informed that a grievous instance of the same kind, leading to not inconsiderable loss of life, recently occurred in this country.

But in coming to cases of this description, there is no longer question of the merits of vaccination. If recorded instances of the kind—instead of being so few that you may count them on your fingers—were of innumerable frequency, they would make no argument against vaccination. Only they would—if possible—render more obvious than it is, the expediency and duty of providing that this great self-defence of nations against pestilence be not ignorantly and recklessly administered.

General result.

Here indeed is the whole gist of the matter. Earlier parts of this letter have shown that by vaccination, properly administered, the once enormous fatality of small-pox may be reduced almost to nothing. The present section justifies a conclusion, that against this vast gain there is no loss to count. Of the various alleged drawbacks to such great advantages the present state of medical knowledge recognizes no single trace. Jenner's discovery—properly utilized—has been a pure blessing to mankind, an unmixed addition to the strength and happiness of nations.

To say of vaccination, that it has sometimes been ill administered—to say that, under pretext of its administration, harm has sometimes been given instead of good, poison instead of antidote—is to speak, not against it, but — whether rightly or wrongly — against its administrators.

The vaccinations of Europe are now counted annually by millions. It may be vain to hope that every lancet shall be used with equal skill and equal carefulness, or that all

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a specific infection, might, I presume, happen at the vaccine punctures of a child having latent constitutional syphilis. Under the operation of this constitutional taint, they, or one of them, might become the seat of secondary syphilitic ulceration, and greatly perplex any observer in ignorance of the real cause; especially, of course, if the parents were endeavouring to disguise the previous facts of the case.

* Dr. Heim (op. cit. p. 613) observes that an universal infection (allgemeine Landesseuche) of scrofula must very long since have occurred if this disease could have been communicated by vaccination; and he adds, that perhaps it would not have been much better with the diffusion of secondary syphilis. Dr. Heim is among those who have experimented on the subject; and his results accorded with M. Taupin's conclusions as to the non-communicability of syphilis by the lymph of a Jennerian vesicle.

populations shall be equally anxious to render those operations successful; but medicine at least has contributed her share, in showing that — subject to these conditions — small-pox needs cause no further fear, nor its antidote be accepted with mistrust.

V. PUBLIC VACCINATION IN ENGLAND.

MORE than forty years had passed since the time when Jenner's discovery first became an accepted part of medical science. Throughout the continent of Europe arrangements more or less complete had long been made to render it of universal application. Its triumphs were everywhere recognized. During eight consecutive years in the Grand Duchy of Baden, during thirteen consecutive years in the city of Copenhagen, there had been no single death from small-pox.

While foreign governments were thus fulfilling the aspirations of the English surgeon, and by vast economies of human life were realizing the new source of national strength which his genius had given to mankind, in Jenner's own country there was less progress to be traced.

Till 1840 no general provision was made.

National Vaccine Establishment.

The action of the British Legislature had been confined to subsidising by an annual grant (finally of 2,000*l.*) the National Vaccine Institution. This establishment, directed *ex officio* by the annual heads of the London Colleges of Physicians and Surgeons, had, since the year 1808, fulfilled the indispensable object of maintaining and furnishing supplies of vaccine lymph; but it had never possessed either apparatus or authority for any general system of vaccination. Its labours as a vaccinating establishment were of little importance, except as subsidiary to the other and main object of its existence; for its vaccinations were confined to London, and even here, at their utmost, were but in small proportion to the requirements of the metropolis.*

Charity Vaccination.

Charitable institutions and the generous zeal of the medical profession did very much to diffuse the benefits of vaccination. But, with so great an interest at stake, this dependence on casual good will seemed an uncertain title to the desired possession, especially while it was "held that an overseer was not bound to take measures to procure the poor children of the "parish to be vaccinated during the prevalence of small-pox." †

Large small-pox mortality of the years 1838–40.

The working of this negative system can be measured but imperfectly by statistical evidence; either as to the defect of vaccination, or as to the consequences therefrom resulting. For on the one hand, no account was kept of persons charitably vaccinated; ‡ and on the other hand, till after 1837 (when general registration began in this country) there could be no authentic knowledge of deaths by small-pox. But, from the establishment of the General Register Office in 1837 to the abandonment of charity-vaccination in 1840, there exist accurate mortuary records; and from their results, as embodied in the Second and Third Reports of the Registrar-General, I learn that nearly 36,000 deaths by small-pox signalized

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* The Annual Report of 1839 states, that in 1838 (when small-pox was severely epidemic) the establishment vaccinated 18,659 persons, being "6,241 more than had been vaccinated in the metropolis and neighbourhood in any former year," and more than double the present average of its vaccinations. The births in the metropolis in 1838 were about 55,000.

† The Vaccination Acts, by Danby P. Fry, Esq., page 20, note.

‡ The Recruiting Returns of the Army Medical Board for the years 1846–55 show that, among 136,113 recruits medically inspected and found fit for service, the marks of previous vaccination or small-pox were as in the annexed Table; or, in round numbers, that out of every 14 young men of the enlisting population, at least 3 had had small-

Number of Recruits.	Having Marks of Vaccination.	Having Marks of Small-pox.	Having no distinct Marks of either.
136,113	96,545	29,220	10,348
Rate per 1,000 -	709	215	76

Especially of unvaccinated children.

those last three years of non-legislation. Further, an inquiry made into the ages of the victims of 1839 showed that three fourths of their number were children under five years of age, who, in nearly every individual case, must have been unvaccinated; since death by post-vaccinal small-pox at that early period of life is almost an unknown occurrence.*

First provision for general public vaccination under optional system.

Seventeen years ago, the Legislature provided (3 & 4 Vict. c. 29) that vaccination at the public cost might be claimed of local authorities in every parish of England and Wales; and this enactment was followed by a further provision (necessary, because Poor Law guardians and overseers were to be the administrators of the law) that gratuitous vaccination should not place its recipient in the position of persons receiving parochial relief.

Small-pox during the years 1840–53.

This measure, after thirteen years experience of its working, was found insufficient for its purpose. There was improvement, indeed, so far as could be ascertained; for the small-pox death-rate during the three years 1838–40 had been 770 per million, and now was only 304; but the latter death-rate denoted for England more than 5,221 annual deaths, and of these, as before, the vast majority were infantine. A classification made, according to age, of 4,858 small-pox deaths which occurred in London during the five years 1848–52, and of 4,227 small-pox deaths which occurred in England in 1847, shows, as in the annexed table, that more than two thirds were under five years of age, and that but a sixth of the number had completed ten years.

Ages at Death of 9,085 fatal Cases of Small-pox.

	At all Ages.	0–5.	5–10.	10–15.	15 and over.
England in 1847	4,227	3,114	527	111	475
London in 1848–52	4,858	3,265	659	154	780
Total	9,085	6,379	1,186	265	1,255

Continued high mortality of infants under optional system.

With the accurate knowledge already possessed on the protective powers of vaccination, the above facts could be interpreted in only one way. Putting aside all question of the older victims, and omitting all reference to the records of public vaccination, the observer of those facts could be quite certain that in England annually about 4,500 infants and children were dying by one specific parental neglect.

Continued indifference towards early vaccination.

And this certainty was made doubly certain by the annual statements of the Poor Law Board on the progress of public vaccination. During the five years 1848–52 the annual births in England had averaged 568,811; but the public vaccinations of infants under one year of age had averaged only 180,961. It was argued (and subsequent events have shown the argument to have been sound) that, if the Vaccination Extension Act had been working in a satisfactory manner the number of infantine vaccinations would have been double, if not triple, what it was. Indeed the same official statistics which showed the above-stated deficiency of infantine vaccination showed also that this neglect arose neither in reluctance to profit by the new institution of gratuitous vaccination, nor in prejudices against the thing itself, but mainly in men's passiveness of procrastination. For while the annual public vacci-

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pox, 10 had been vaccinated, and 1 had undergone neither small-pox nor vaccination. From this it may be inferred that at the birth time of these recruits (20–30 years ago) the vaccination of infants, as compared with the number of births, was very considerably under the proportion $\frac{7}{10}$; because the generation from which those recruits were survivors must have lost a disproportionate number of its unvaccinated, not only by small-pox (which would have affected them almost exclusively) but likewise by those infantine diseases which would have destroyed many before the age at which vaccination is performed.

* Dr. Gregory, in reference to the small-pox deaths of this period, speaks of them as having occurred "in great "majority among infants and very young children, not one of whom had probably ever been vaccinated." He says, "we have satisfactory evidence that under fifteen years of age the deaths by small-pox after vaccination are scarcely noticeable."

nations of infants under one year of age had averaged only 180,961, those at higher ages had averaged 185,139; in other words, public vaccinations were being performed to the amount of nearly two thirds the annual number of births; but with such indifference towards the object to be obtained, that not half of such vaccinations were performed within even the first year, and of course a much smaller proportion within the first six months, of life. No wonder that, with this carelessness on the subject, small-pox continued to be fatal to large numbers of the infantine population. And a further statistical analysis of the material I have already quoted shows, that while more than two thirds of all deaths by small-pox were happening under five years of age, deaths in the first year of life made more than a third of this proportion.

1853. First establishment of compulsory system.

Under these circumstances, some improvement in the law was evidently required; and in 1853 such improvement was partially effected by an Act (16 & 17 Vict. c. 100.) to "Extend and make compulsory the Practice of Vaccination." This law, which has now been in force nearly four years, makes it an obligation on parents and guardians that every child (its health permitting) shall be vaccinated within, at furthest, four months from birth. It also attaches a penalty to non-compliance with this enactment, and provides that Registrars of Births (who are to keep record of all vaccinations under the Act) shall at the registration of each birth give to the persons concerned a printed notice of their legal obligation.

Principle of the law.

This was indeed a very important measure. Infantine vaccination was at length recognized at its full value. Henceforth it was to be counted among those conditions, necessary for the maintenance of life, which a parent should not be entitled to withhold (any more than food or clothing) from his offspring.

To what extent was it an interference with private rights?

Persons, unacquainted with the circumstances under which this law was made, have doubted whether it was not an improper restriction of personal freedom. It being assumed as the limitary principle of human law, that men may be left free to follow every inclination which relates only to themselves, it would certainly seem foreign to the province of legislation to insist on one's caring for one's own health; and if a man's having small-pox could affect none but himself, little need be said against his right of having it *ad libitum*. Even in this light, however, it deserves consideration that he who indulges a preference for small-pox, does so to the detriment or danger of his neighbours; and as they often suffer by his infection, so they might reasonably claim to be heard on that question of his privilege. Still the main object of the obligatory law, as I understand it, is not to prevent adults from cultivating—if they be so minded—a personal taste for small-pox; its object is to prevent them from *compelling* (for in this case *allowing* amounts to compelling) their children to incur the worst perils of that disease. The interference of the law was an interference between parent and child:—a kind of interference very sparingly exercised in this country, and the exercise of which on slight grounds would of course be intolerable. The practical justification of any such law depends on the amount of evil which it is designed to correct; and four or five thousand annual deaths by one specific parental omission constituted in this case a strong argument. It was under pressure of this appeal, that the Compulsory Vaccination Act was passed. The option which the new law restricted was not that of a conscious agent deliberately preferring for himself the dangers of small-pox to the securities of vaccination. The thousands who annually died of non-vaccination had never raised their voices for the privilege of unrestricted small-pox. The so-called "liberty"—thenceforth to be abridged—was that of exposing unconscious infants to become the prey of a fatal and mutilative disease. It was this *liberty of omissional infanticide* which the law took courage to check.

It seems to me that persons most careful for true liberty might, on the alleged grounds, be most urgent to provide for the compulsory vaccination of infants: and I believe that the general sense of the public concurred with the conclusion of the Legislature, that here was one of the many occasions on which, for common good, individual crotchets ought to give way.

Doubts might have been felt as to its practical working.

Yet let me confess for myself, that, if I had had occasion four years ago to express an opinion on this subject, I should very greatly (and, the result shows, very wrongly) have feared the operation of such a measure. Not for a moment, indeed, should I have doubted the moral right of the legislature to interfere—if it could successfully interfere—with that ignorant or wicked negligence which was killing so many thousands of helpless children: but I should have dreaded lest another evil might result from the enactment of a compulsory law. Believing that vaccination is, beyond all comparison, the greatest practical good with which medical science has enriched us, I should have felt the utmost apprehension lest, by association with penal provisions, it might perhaps become unpopular; lest this apparently unnatural combination should excite resistance or suspicion; lest the public should in any degree mistrust a gift, which the law would compel them to accept.

Such doubts have been solved.

In fairness towards others who perhaps still entertain these doubts, I frankly confess to you that, four years ago, they would have been my own: but I am now most glad to be able to show that such alarms would have been unnecessary. Experience has already disposed of them. Partly from the English habit of respecting every actual law, and partly no doubt because the justice of this particular one was recognized, the Act for compulsory vaccination was obeyed with alacrity. And many arguments on the subject may be saved by a simple perusal of the annexed table. The first line of figures gives the average (to which I have already referred) of births and of public vaccinations during the years 1848–52; and you will observe that while the births in England were 568,811, the infantine vaccinations were only 180,960. In 1853 the law was altered. In 1854 you find the infantine vaccinations considerably more than doubled. From 180,960 they had risen to 408,824. And not only this. The indirect action of the law had extended to induce what it could not compel; and vaccinations at ages after the first year of life had likewise been increased by more than 100,000 cases. Thus in 1854, under the immediate influence of the new law, the total public vaccinations of England at all ages exceeded by more than 75,000 the total number of births; the large majority of 290,111 cases in the third column consisting no doubt of young children, whose vaccination under the former defective system had been indefinitely delayed.

Immediate very large increase of infantine vaccination.

—	Annual Public Vaccinations.		Annual Births.
	Under One Year of Age.	Over One Year of Age.	
Average of the Five Years 1848–52	180,960	185,139	568,811
1854 - -	408,824	290,111	623,699
1855 - - -	354,979	109,120	623,181
1856 - -	350,847	84,165	640,840

Subsequent decline in this increase.

The table shows a further important fact. In the line for 1855 and in that for 1856 you will notice again a decline in the number of vaccinations; not alone in the third column (where a decline from 290,111 to 109,120, and again from 109,120 to 84,165, might mean only that the first year of activity had so far cleared off existing arrears in the category as to leave but few non-vaccinated children to appear afterwards) but also in the second column; where a decline from 408,824 to 354,979, and from 354,979 to 350,847, infantine vaccinations can only denote that the *stimulus which was given to early vaccination by the new law in the first year of its working, became in the second year less effective than in the first, and in the third less effective than in the second.*

Meaning of the secondary decline in the number of infantine vaccinations.

The explanation is simple. At the first passing of the law, people hastened to obey—because they feared to disobey—its imperative provisions. The possibility of a summons and of a fine was before them. This, which would not have conquered any resolute objection, was just enough to stir that mere indifference which among uneducated persons is the main obstacle to universal infantine vaccination. The law commanded *and threatened;* so it must be obeyed. Thus, in the first year: but it was soon discovered that the threat was an empty one, that it could not be fulfilled, that the law had provided no machinery for its execution. And then forthwith obedience began to decline in the proportion which those figures express.

Defect in the Act of Parliament.

In short it is a radical defect in the Act, considered in its compulsory relations, that the duty of warning defaulters, and the discretionary power of proceeding against them, are assigned to no local officer or local authority, and that consequently the compulsory provision of the law rapidly tends to be regarded as a dead letter.*

Progressive diminution of

Still it is impossible to overlook that great good has been done.† It would be premature

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* The annexed Table (for the particulars in which I am indebted to Mr. Tomkins, Inspector of Vaccinations to the National Vaccine Establishment) illustrates that disobedience to the secondary provisions of the law has also increased, and—to judge from this sample—has prevailed in a large majority of even those cases in which vaccination has been duly performed. The Act of Parliament requires that vaccinated children shall on the eighth day be taken back for inspection as to the success of the vaccination, and shall receive a certificate of its success. Mr. Tomkins shows that, of 407 cases vaccinated by him in the last 6½ months, only 97 were brought back for inspection, and only 3 received certificates. The Registrar's Notice, which enjoins that "this paper must be shown to the medical practitioner when the child is taken to him for inspection after vaccination," was presented in only 58 of the 97 cases.

Proceedings at the Central Station of the National Vaccine Establishment.	Vaccinations performed by the Inspector.	Cases brought back for Inspection on the 8th Day.	Cases brought with their corresponding Registrar's Notices.	Certificates of Successful Vaccination given to Applicants.
Sept. 1853—Sept. 1854	1192	289	265	86
Sept. 1854—Sept. 1855	1502	210	179	29
Sept. 1855—Sept. 1856	943	256	195	24
Sept. 1856—April 1857	407	97	58	3

† On the whole three years the infantine vaccinations of England and Wales have amounted to nearly three fifths of the births. The annexed table, giving an account of such vaccinations in the different parishes of the metropolis, may illustrate how very unequally different places contribute to the general proportion. In the parish of St. Matthew, Bethnal Green, for every hundred births during the three years 1854-6, there have been 81 infantine vaccinations by the public vaccinator. In the parish of St. Luke's there have been only 28. Without local inquiry, it is not possible to decide how much of the apparent insufficiency of infantine vaccination in certain districts is really what it seems; but there are many differences in the table for which I am unable to account otherwise than by supposing that there are corresponding differences of merit in the local arrangements for public vaccination.

INFANTINE VACCINATIONS performed in the METROPOLIS during the TRIENNIAL PERIOD 1854-6.

PARISHES.	Births.	Vaccinations under 1 Year of Age.		
		Successful.	Total number.	Total number per 100 Births.
St. Matthew, Bethnal Green	10,944	7,909	8,880	81·1
St. Luke, Chelsea	5,670	3.250	3,427	60·4
Clerkenwell	6,642	3,215	3,216	48·4
Fulham	3,119	1,866	1,883	60·4
St. George (East)	5,585	2,448	2,462	44·1
St. George (Hanover Square)	6,195	3,031	3,311	53·4
St. Giles and St. George (Bloomsbury)	5,357	1,870	1,891	35·3
Hackney	6,347	2,935	3,002	47·3
Hampstead	987	344	396	40·1
Holborn	4,223	2,381	2,446	57·9
St. Mary, Islington	12,209	6,422	6,626	54·3
St. James, Westminster	2,816	1,278	1,492	53·0
Kensington	5,056	2,032	2,079	41·1
City of London	3,611	1,141	1,152	31·9
East London	4,517	2,406	2,447	54·2
West London	2,457	1,552	1,561	63·5
St. Luke, Middlesex	7,457	2,059	2,085	28·0
St. Margaret and St. John, Westminster	6,618	4,125	4,356	65·8
St. Martin-in-the-Fields	2,001	1,435	1,479	73·9
Marylebone	13,620	6,543	6,578	48·3
Paddington	5,015	1,885	1,933	38·5
St. Pancras	18,200	8,243	8,407	46·2
Poplar	7,570	4,337	4,381	57·9
Shoreditch	14,045	8,355	8,618	61·4
Stepney	13,188	5,699	5,730	43·4
Strand	7,412	2,584	2,637	35·6
Whitechapel	8,301	5,926	6,113	73·6
Bermondsey	6,152	2,764	2,805	45·6
Camberwell	5,995	3,043	3,271	54·6
St. George, Southwark	5,750	2,881	3,078	53·5
Lambeth	15,813	6,087	6,217	39·3
St. Mary, Newington	7,844	3,252	3,388	43·2
St. Olave	1,717	866	866	50·4
Rotherhithe	1,754	836	836	47·7
St. Saviour	3,762	2,803	2,803	74·5
Wandsworth and Clapham	5,358	2,359	2,420	45·2
Greenwich	11,464	6,041	6,278	54·8
Lewisham	4,361	1,655	1,753	40·2

small-pox has followed the successive improvements of the law.

to say much on the influence against small-pox which the new law must already have exerted; for conclusions in medical statistics take long to ripen, and here we have only two years' experience to record. Yet I may beg you to read the annexed table, as showing that diminutions in small-pox mortality have hitherto kept pace with improvements in the law. The first line of this table expresses the high mortality which belonged to the last three years of the period of *charity-vaccination.* Its second line expresses the greatly reduced mortality which belonged to the period of *optional vaccination.* Its third and fourth lines express the very much smaller mortality which has attended the system of *compulsory vaccination* during the two years of its adoption. If such figures are insufficient to sustain a pathological argument, they are at least enough greatly to encourage the Legislature to further improvements of the law.

Periods compared.	Annual Deaths by Small-pox in England and Wales.	Annual Rate per Million of the Population.
Average of three years 1838–40	11,944	770
Average of nine* of the years 1841–53 - -	5,221	304
1854	2,808	149
1855	2,525	132

* N.B.—During the four years 1843–6 causes of death were not distinguished in the reports of the Registrar-General.

Further improvements are required.

Precaution to be taken against any too peremptory working of the law.

And such improvements are indubitably called for. First, in order to fulfil those objects which are expressed in the title of the last Act, "To extend and make compulsory the Practice of Vaccination," it is requisite to amend that defect which I have named. Yet, while for the recited purpose, it is indispensable that the law should be rendered quite stringent and workable, it seems to me scarcely less important that it should never be worked in an oppressive dogmatical manner, and that appeal to its penal provisions should as rarely as possible be made. Against any abuse there would be given, I think, the amplest security which the nature of the case admits, if the power of summoning offenders before a magistrate could be exercised only under direction of the Local Board. With the threat of this power in the distance—with the knowledge that in cases of obstinate disobedience it could really be invoked and really become operative — I believe that such cases would not exist; that practically the *compulsion* of the law would consist in the fact of a local officer sending his reminder to persons in default; for that this reminder (itself exceptional) would almost invariably produce an immediate compliance with the law.

Provision is required for more uniform good quality of vaccination.

I have said that the compulsory enactment of 1853 *partially* effected the desired amelioration of the law. It was, however, no trifling part which remained for improvement. And not only does it still remain; but indeed the very change which was made has rendered still more imperative the necessity for a further and completing reform.

For surely no principle can be more obvious than this:—that if the State professes to vaccinate the people—above all, if it compels the people to be vaccinated—it must take every possible security for the excellence of the vaccination which it offers.

The Legislature has hitherto not recognised that there is such a thing as bad vaccination. And indeed, in large part, vaccination is certainly good; otherwise small-pox could not, within half a century, have been, as it has been, rendered comparatively infrequent and innocuous. Yet, that there is current in England and Wales not only an appreciable amount of utterly incompetent vaccination, but a very considerable proportion of second-rate vaccination, is quite certain.

Mr. Marson's evidence as to the excess of bad vaccination, and as to its consequences.

I know of no person so qualified to speak on this subject as Mr. Marson; who for more than twenty years has resided as surgeon in the Small-pox Hospital of London, and has continuously applied himself to record the results of non-vaccination and of sham vaccination.

I have already quoted this gentleman's very important observation, that if vaccinated persons happen to contract small-pox, the mortality among the best-vaccinated of the number is but one-thirtieth part of the mortality among the ill-vaccinated. And as regards the large and lamentable preponderance of the latter class, Mr. Marson's Papers (see page 19) will show you that of 3,094 vaccinated persons whom he has seen suffering with small-pox, only 268 presented what he considered the marks of thorough vaccination. Mr. Marson insists on "evils, more especially affecting the humbler classes, connected with the circumstances under "which vaccinations in country districts are performed;" and further, his opportunities having enabled him to judge of the vaccinations of other kingdoms of Europe, he assigns even a very low relative rank to the performances of England; observing, that "there can "be no justifiable reason why the rural inhabitants of England and Wales should be, as "he knows them to be, far less well vaccinated than are the rural inhabitants of Denmark, "Sweden, and Prussia."

And—besides the terribly large proportion of patients, nominally vaccinated, whose vaccination, because of unskilfulness, has been but of partial effect—there are other cases "of "frequent occurrence at the Small-pox Hospital," where patients are in the category of non-vaccinated persons, simply because bungling operators have failed to vaccinate them. "With "good lymph, and the observance of all proper precautions (says Mr. Marson) an expert vacci-"nator should not fail in his attempts to vaccinate above once in 150 times; yet a large "number of those, who take upon themselves the duty think they do very well if they "succeed, however imperfectly, five times out of six; and patients often present themselves "with small-pox at the hospital, who state they have been cut five, six, eight times, or more, "for cow-pox without effect."

Local prejudices against vaccination often testify to the same effect.

Far less precise than Mr. Marson's experience, but in its own way equally deserving of consideration, there is other evidence which raises great doubts as to the quality of much current English vaccination. Among the so-called prejudices against the practice, there are some which represent a partial truth; erring indeed only in so far as they impute generally to vaccination what they should have imputed exclusively to the vaccinator. Considerable disturbance of health has often followed—sometimes to a dangerous and even fatal extent—the improper acts of persons pretending to vaccinate. If all operators equally had been impressed with the necessity of following Jenner's short and simple teaching; if all equally had inquired into the state of health of children they were about to vaccinate, and had stayed proceeding till any temporary ailment had been removed; if all equally had been careful as to the condition of children from whom lymph has been taken; if all equally had been content to study the natural progress of the Jennerian vesicle, and the different qualities of material which it furnishes at successive stages, or under accidental disturbances, of its course; if, in short, all equally had recognized that vaccination is not a mere easy trick of the fingers, that it requires to be done, and that its results require to be followed, with the observant eye of an educated special experience;—if, I say, the substance of this had been in the minds of all who have pretended to vaccinate, little, very little, would have been heard of prejudices against that matchless discovery. A local prejudice against vaccination would, in my judgment, be a reason for inquiring into the skill with which, in the prejudiced locality, vaccination has been administered; whereupon I should not be surprised to hear of some individual case in which nominal vaccination has either proved useless as a protection against small-pox, or has occasioned unexpected suffering to the child; and the inquiry, if pressed further, would probably show that the origin of this scandal has either been (on the first supposition) one of those imperfect vaccinations against which Mr. Marson protests, or (on the other supposition)

some incompetence or neglect relating to the selection of lymph, or the due preparation of the patient. When I reflect how entirely the local repute of vaccination may be affected by one or two cases of this description, and at the same time remember our present absolute insecurity against their very frequent occurrence, I feel very strongly convinced that vaccination has not had a reasonable chance of becoming popular in this country. "It should be remem-
" bered" (says Mr. Marson, in his Petition to the House of Commons) "that no authorized
" system of vaccination has been established in England. All persons—medical men,
" clergymen, amateurs, druggists, old women, midwives, &c.—are allowed to vaccinate in any
" way he or she may think proper, and the persons operated on are considered to have
" been vaccinated."

Miscellaneous practitioners of vaccination.

It is certain that the non-medical male and female vaccinators to whom Mr. Marson refers must often have brought scandal on the practice, and that many persons have met their deaths by small-pox under the false security of such unskilful vaccination. The present law requires under penalty that the infant (its health permitting) shall be taken for vaccination to "some duly qualified medical practitioner," who shall afterwards certify the results of his proceeding. It is probable that under working of this provision the number of amateur vaccinations has considerably decreased; but obviously the intention of the law remains liable to be frustrated, while vaccination can with impunity be attempted by persons who cannot even legally, much less competently, give any certificate as to its results.

Probably diminished under existing law.

To what extent vaccination has been unskilfully performed by persons purporting to be members of the medical profession, and to what extent (within a much narrower circle) it has been unskilfully performed by persons possessing legal credentials of their qualifications to practise surgery, are questions which I cannot answer.

As regards the system of public vaccination in this country, it is principally in the hands of the Poor Law Medical Officers of England and Wales; and I cannot refer to these gentlemen without begging you to understand, that some remarks which I shall directly offer on that system are not intended as a criticism on the staff by which so many of its advantages are dispensed. Indeed I am reluctant to leave unexpressed the very deep respect which I feel for their often ill-requited labours. Among them there are men—not a few—whose lives are continuous acts of unrecorded self-devotion; whose disinterested goodness conduces, equally with the achievements of our great masters, to ennoble the medical profession. And looking to the whole body, and to its whole ministrations, I will venture to say, that no other walk of human life can show a larger proportion of skill, education, and conscientious industry, than is given by these officers—too frequently under circumstances of non-appreciation and discouragement—to the daily and nightly comfort of their suffering fellow creatures.

Public vaccination chiefly by Poor Law medical officers.

It is for the interest of this meritorious body of men (not less than of the public) that in a system which they chiefly contribute to work, competence and incompetence should not be confounded together; especially, that all future admissions to the number of public vaccinators should be of persons fully qualified for the duties they venture to undertake.

And this brings me to the point at which I am obliged to mention one serious defect in reference to my present subject—the absence, namely, of proper provision for the general study of vaccination.

Absence of provision for general study of vaccination.

While the law provides a specific machinery for public vaccination, offering it gratuitously to all persons; and still more, while the use of this very machinery is in fact, for at least two-thirds of the population, not optional but compulsory; so long, I have ventured to assert, it is a moral obligation on the State, that what it thus invites and compels people to accept shall

Under present system a public vaccinator may be appointed who has in no degree studied vaccination.

be of at least good quality. It was the intention and, I humbly think, a wise intention of the Legislature, that the responsibility of choosing the most efficient person for each appointment as public vaccinator should be vested in local authorities, subject only to the limitation that none but "legally qualified medical practitioners" should be contracted with for the purpose. It was naturally believed that under this limitation every needful security was taken for the uniform appointment of persons possessing familiarity with the practice of vaccination. About two dozen varieties of medical practitioners attest the utter incoherence and insufficiency of our laws relating to the medical profession; and no one, so far as I am aware, has hitherto succeeded in defining what, among these, is a "legally qualified medical practitioner" in the sense of the law referred to. But, defined or undefined, that term does not give the security which it surely was the intention of the Legislature to take. There is (I feel some shame in confessing it) *no general test of medical proficiency which implies a knowledge of vaccination.* Nor, so far as I know, have we *any medical school where vaccination is systematically and practically taught.* The young man who formally undergoes the now almost superseded apprenticeship to an apothecary, or who in any other capacity resides during his pupilage with a medical practitioner (especially if that practitioner be in the Poor Law medical service) will generally have had fair opportunities of learning to vaccinate. But this case is far, very far, from being universal; and as regards other students of medicine, I can offer no opinion on the source whence their knowledge is to come. There may be examinations of which I have never heard. There may be schools of which the particulars are not before me. Therefore I will not venture to affirm that no candidate at the College of Surgeons has ever been asked a question on vaccination, or that no medical school in England and Wales teaches the practice of vaccination. But the truth would not be very remote from these assertions. And the point which is of real importance for my present argument is, that a medical student may pass through an industrious and creditable pupilage—may obtain his diploma, license and degree, as physician, surgeon, apothecary, and doctor—may become, in every possible sense of the word, a "legally qualified medical practitioner"—may be eligible and actually elected for the appointment of public vaccinator—and meanwhile may never have performed, perhaps even never have witnessed, one single act of vaccination.

Appointment must be of "legally qualified medical practitioner:"

but a "legally qualified medical practitioner" may never have seen a vaccination.

In future modifications of the law these circumstances will require to be considered. It seems a necessary complement to what has already been enacted, that candidates for the appointment of public vaccinator should give evidence of having learnt to vaccinate, and that public facilities should exist for the practical study of vaccination.

Arrangements for national vaccination are matter of medical science.

Administrative arrangements for the supply of public vaccination cannot properly be considered a merely secretarial affair. What has to be administered is not a mechanical matter of routine and registration; but a system which from beginning to end, and from centre to circumference, requires in all its parts to be vitalized by the *science of medicine.* Only thus, as it seems to me, can that security be given, which the public has a right to demand, for the uniform excellence of public vaccination. Only thus can local prejudices against vaccination be successfully and permanently resisted. Only thus can the thing itself be rendered the unqualified blessing which it ought to be.

Necessary conditions for efficiency of the system.

And it seems to me that arrangements for these ends can only be expressed in some such conditions as the following:—(1) in the special qualification of public vaccinators; (2) in systematic medical supervision of the results of public vaccination; (3) in thorough medical inquiry whenever cause of complaint is alleged or suspected; and (4) in the regulation of details of the service on a uniform plan under the advice of members of the medical profession specially skilled in the subject.

Proposed transfer of superintendence of vaccination to the Health Department of the Government.

The accomplishment of these objects was aimed at in that proposed transfer of the superintendence of vaccination to the Board of Health, which was the chief feature of last year's Bill, introduced by the President of this Board, and the President of the Poor Law Board.

Grounds for this proposal.

It was believed by both Boards that the transfer of this important branch of medical administration to that department which has specially to concern itself with medical subjects would conduce to the public service. It was believed that this department (permanently employing a medical officer) would be better able than the Poor Law Board (which has no medical element in its constitution) to give the requisite supervision to the results of public vaccination, and to direct by a medical inspector those inquiries which outbreaks of small-pox, or complaints of mal-vaccination, or other circumstances might render necessary. It was further believed that the constitution of the Board of Health, while enabling it more easily than the Poor Law Board to effect *de die in diem* these acts of supervision, would also give peculiar facilities for a still more important action. It was believed that, by using in the interests of vaccination its powers of appointing a *Medical Council*, the Board of Health could obtain, in a public and recognized manner, the advice—not only of those eminent functionaries of the Colleges of Physicians and Surgeons who at present, as an annual board, direct the distribution of lymph from the National Vaccine Establishment — but also of other persons, whose special labours in regard of small-pox and vaccination qualify them to be advisers of the Government and guides of the medical profession in whatever relates to the subject. It was believed that under such advice the Board might, with great advantage to the public service, *bring into one system the arrangements for public vaccination and the hitherto separate arrangements for the supply of vaccine lymph*;[*] might *fix conditions of qualification for the future appointment of public vaccinators*; might thus *indirectly promote among medical students the general and thorough study of vaccination*; might *provide that certain large vaccinating stations should become self-supporting schools of practical instruction*; and might *issue regulations of detail for many matters in public vaccination* which at present (not desirably for their object) are left to personal option, or regulated on non-medical grounds.

Especially as to objects which could be attained only after special medical consultation.

Memorial of Epidemiological Society on administrative arrangements for vaccination.

The necessity for some such organization as I describe has long been obvious to the medical profession; and important suggestions on this subject were addressed two years ago to Sir B. Hall, then President of this Board, by the President and Council of the Epidemiological Society of London. From the high professional character of the gentlemen whose opinions were expressed in this memorial, it was entitled to have much weight; the more so, as the Epidemiological Society had given special investigation to the subject, and had acquired intimate knowledge of the existing defects of public vaccination. Although the memorial cannot be considered as a paper written in direct reference to my present object (having indeed been addressed to the Board before I had the honour of being its officer) yet it was of so much importance in drawing the attention of the Government to

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[*] Obviously these are natural parts of one system; and their present separation in England threatens a serious inconvenience. The first establishment of parochial vaccinations in 1840 had already much reduced the vaccinations of the National Vaccine Board, and the Compulsory Vaccination Act effected a still larger reduction. While its vaccinations have thus greatly diminished, and are liable to further diminution, the demands on it for supplies of lymph have increased, and tend constantly to become larger. Reference to the table at page 177 of the Appendix shows in detail what has been the operation of the last-named Act:—the annual average of vaccinations has fallen from 10,713 to 8,207; while, from this greatly reduced number of arms, the supply of charges of lymph has increased from 211,404 to 220,293.

Importance of a due recognition by Local authorities of the exertions which are requisite to ensure really successful results.

those insufficiencies of administration which you now seek to remedy, that I have inserted it (seq. page 177) among the documents of my Appendix.[*]

Finally, with respect to the present system of public vaccination in England, it remains to be remarked, that local vaccination can never be reasonably good, unless Local Authorities estimate the operation at its due importance. I scarcely know any surgical operation in which the result is so much determined by attention to minute particulars; scarcely any which so specially requires not to be done mechanically and *per* contract. If steam-power or clockwork were applied to the purposes of surgery, it would perhaps be as easy by machinery to amputate as to vaccinate; not because vaccination is a thing of difficult handiwork, but because peculiarly it is a thing for painstaking judgment in its details. If the local successes of vaccination are to be considerable, the public vaccinator must very often incur trouble for which there is no language in his legal contracts. Not rarely he must be content to postpone a vaccination; not very rarely he must repeat one, sometimes again and again. Always he has to watch the results and (as he is paid only for successful cases) to report them with strictness. Timing his vaccinations so as to keep up a continuous succession is in itself no easy task. Kindly consideration for people's feelings, often a little coaxing, sometimes a little authority, always a good deal of discretion, are—if he is to reach his utmost utility—as necessary to him as his lancet. How easily in all these particulars, and many more, might a vaccinator, bound only by his legal contract, escape an infinity of trouble with no ostensible fault! And unless he be fastidious in his choice of lymph, he had better not vaccinate at all; yet the difference between routine lymph and eligible lymph is to him a doubling of his labour. These are matters which can be but imperfectly known to local authorities, and which have, I dare say, seldom been considered in reference to the price to be paid for public vaccinations. Boards of Guardians in making arrangements for public vaccination in their several districts have perhaps not sufficiently regarded another peculiarity of the case: when they contract for bread and cheese, they can themselves verify the fulfilment of the bargain, and pronounce on the quality of supply: when they contract for public vaccination, they can only rely on the honour of their contractor. It is therefore indispensable to the success of public vaccination that local authorities should duly estimate the amount of skill and conscientiousness to which they thus unreservedly trust; and that hoping to find zeal and science enlisted in their service, they should not fix their standard of payment below that which the common opinion of the medical profession would consider a reasonable and remunerating price.

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Recent correspondence on the subject of the preceding letter.

In concluding this letter, I refer but very briefly to that valuable mass of information (App. J and K) which the liberality of foreign Governments and the kindness of distinguished members of my profession enable me to lay before you.[†] I venture to believe, Sir, that you will share the sense of obligation with which I refer to these large contributions of national and professional experience. Communications so important will best speak for themselves. Any attempt to give an abstract of their contents might end in frittering away their value; and the respect which I feel for so remarkable a collection of independent testimony leads me greatly to desire that it should be read in the words of its authors.

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[*] Important criticisms on the plan advocated by the Epidemiological Society, and generally on legislation in reference to the present subject, are contained in Mr. Rumsey's learned and thoughtful "Essays on State Medicine;" London, 1856.

[†] Since the date of this letter, I have received a valuable communication (Die Kuhpocke und ihre Bedeutung; eine Beantwortung der von der K. grossbritt. Gesandtschaft vorgelegten Fragen; von Dr. Raimund Melzer, k.k. Director des Bezirkskrankenhauses auf der Wieden in Wien) from Dr. Melzer, of Vienna; which, if it had reached me earlier, I should have laid under considerable contribution. Dr. Melzer treats the entire subject with much skill; but the especial interest of his paper consists in a comparison which he draws (with the support of some volumes of documentary evidence) between Carniola and Carinthia, in respect of their prevailing diseases. He affirms (in a sense directly opposed to M. Carnot's doctrine) that Carinthia, where vaccination has been greatly resisted, suffers so much

Circular of questions addressed to members of the medical profession, to departments of the public service, and to foreign governments.

Therefore it is that I append scrupulously *in extenso* the replies which I have received to my Circular of Questions. Throughout the preceding pages I have in no case referred to such of them (J) as are personal, and but very rarely to those (K) which are official. Accordingly, you may consider the answers as representing so many additional witnesses hitherto, almost without exception, unexamined; and you will judge whether their testimony confirms or invalidates that which I have compiled from other sources, or stated as my own conviction.

My four questions are as follow :—

I. *Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of small-pox, and almost absolute security against death by that disease?*

II. *Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*

III. *Have you any reason to believe or suspect that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*

IV. *Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*

Answers to the first question.

The answers to the first question are of fundamental importance, and will repay careful perusal. Not only those which come from foreign Governments, and of which the gist is already before you in compact masses of national statistics; but also the 542 personal answers, which show as it were, fragment by fragment, the material out of which such statistics are compiled. To me these appear specially interesting, because it is by opinions of

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from scrofula, typhoid fevers, and other contagious diseases, as to be unable to furnish the army with its proper contingent of recruits; while Carniola, where vaccination has always been received with the greatest favour, not only furnishes its own contingent, but makes up for the deficiencies of the other province. Also I received, unfortunately too late to be translated for my Appendix, a treatise (Die Kuhpockenimpfung; eine Beantwortung der vom General Board of Health aufgestellten Fragen, von Dr. Carl Friedinger, prov. Impfarzt im k.k. Kuhp. impf. Hauptinstitut, und prov. Hauswundarzt der k.k. Findel-Anstalt in Wien) on the entire subject by Dr. **Friedinger**, of the same city, whose opportunities of observation in the great Foundling establishment of Vienna give peculiar value to his statements. I need the less regret the absence of this communication from my Appendix, as Dr. Friedinger has taken part in furnishing the very important paper (p. 154) which is contributed by the Society of Surgeons of Vienna; and his views are no doubt embodied therein with those of his distinguished colleagues. I have also to thank Dr. **Bertin**, of Nancy, for a paper of much merit (Essai historique et critique sur les attaques dirigées contre la Vaccine) published by him last year in refutation of M. Carnot and his followers. I have read with pleasure and instruction many other works than those which I have expressly quoted in my letter; and among such I may name a very sensible little book written thirty years ago by Mr. **Greenhow**, of Newcastle, and some papers by Dr. Alexander **Knox**, "On the existing state of our knowledge of Vaccination and Re-vaccination," published in the *London Journal of Medicine*, Nos. XXIII and XXIV. I observe that I have not specially quoted Dr. **Eimer**'s very excellent work (Die Blatternkrankheit in pathologischer und sanitätspolizeilicher Beziehung; Leipzig, 1853) and therefore it is incumbent on me to acknowledge that I have often referred to it with advantage. Dr. **Steinbrenner**'s work (Traité sur la Vaccine; ouvrage couronné par l'Académie Royal des Sciences en 1845; Paris, 1846) I have indeed quoted; but hardly in proportion to the indirect assistance I have derived from its learned, but unmethodical, treatment of the subject.—May 20th.

this kind, much more than by columns of figures, that common life is influenced; and the information here collected shows the sort of knowledge of vaccination which is operative throughout Europe on all except the utterly uneducated classes. My question was purposely constructed in such a form as to elicit the expression of every existing doubt on the protective influence of vaccination; and the answers represent, I believe, quite fairly what would have been written by the medical profession if my inquiry had been a hundredfold as extensive as it was. You will observe that, throughout the whole series of 542 respondents there are but 2 whose opinion is negative. One of these gentlemen (No. 508) distrusts vaccination, and "would gladly inoculate his own children with the small-pox;" the other (No. 219) regards both proceedings with equal disfavour, and considers them alike to be at best but harmless trifling. With these exceptions (against which I do not think it requisite here* to argue) every writer expresses confidence in the practice.

That small-pox may exceptionally occur after even apparently excellent vaccination, is of course made evident in these answers as in the previous statistics; but, in the detail of the answers, perhaps better than in the condensation of the statistics, you are able to see how mild a disease small-pox under such circumstances commonly becomes; and you will be struck with the large number of persons who, with great opportunities of observation—sometimes expressly mentioned as having extended over thirty and forty, even fifty and more years—have never seen a single vaccinated person die of small-pox.

One writer only has taken the trouble of stating at length the grounds of his confidence. But this one is Dr. Alison of Edinburgh; whose name commands respect in the medical profession, among hundreds who have profited by his personal teaching, and among thousands who have gathered instruction from his pen. In a paper supplemental to his answers (No. 10) he reviews both the earlier and the later evidence on the subject of vaccine protection, and states his estimate of the argument in terms which must meet almost universal concurrence:—"The question whether successful vaccination gives security to a great "majority of mankind against any attack of small-pox in future life, and to a much greater "majority against fatal small-pox, has been generally regarded in this country for the last "half-century as practically decided in the affirmative; . . . and, since the date of the "papers which were held decisive of the question fifty years ago, there has been quite "sufficient evidence collected to show that the same inference is still inevitable, and that he "who disputes it is equally unreasonable as he who opposes in like manner any proposition "in Euclid."

Dr. Seaton, to whose zealous and valuable labours in the cause of vaccination I have already had occasion to refer, contributes a paper (No. 421) of important supplementary evidence: bringing into relief, unfortunately by contrast, the possible blessings of vaccination; and going no farther than to Scotland and Ireland for illustrations, that—in the absence of this protection—small-pox is still the same deadly and mutilative disease that it was.

Answers to the second question.

Answers to my second question are virtually included in answers to the fourth. Most of the replying Governments have made vaccination compulsory within their dominions; it is therefore superfluous to say that they at least have discovered no drawbacks to its advantage —no vicarious diseases to set against the extinction of small-pox.

So likewise among the 542 personal respondents, not a single one gives the smallest semblance of support to those contra-vaccinal doctrines which I have discussed. Very, very rarely are they even referred to. When I venture to say that M. Carnot's patchwork of figures gives an untrue picture of life, and that M. Verdé de Lisle's presumption and ignorance disentitle him to consideration, I am in the almost solitary position of having felt it a duty to read their writings. I can appeal to few witnesses who have gone through similar fatigue. An occasional German (for those indefatigable scholars read everything on their subject) and an occasional Frenchman (for the scientific world of France has lately been molested with our old experience of foolish pamphlets) may be found mentioning those doctrines, only to condemn them. A single eminent English pathologist (No. 28) refers to them at my request in a special note. Otherwise they are unmentioned, because they are almost universally unknown. You need as little expect to find Sir Benjamin Brodie arguing against them, as Sir John Herschel against the prophecies of Zadkiel.

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* In the margin of Dr. Hamernik's paper, I have taken the liberty of inserting an occasional note at points where he appears to me to have overlooked essential features of the case.

Indirectly the question is illustrated by an interesting series of papers (171, 179, 215, 222, 243, 391, 456) communicated by gentlemen in medical charge of schools. Especially the paper on Christ's Hospital, London, which I owe to the kindness of Mr. Stone, is important, from the largeness of its material. It gives for more than a century the mortuary statistics of an establishment which has contained from five to eight hundred young inmates; and you will notice that in this little population, just as in nations of which the statistics are before you, small-pox has gone without giving place to new diseases; that in the half-century 1801–50, while only one death from small-pox had occurred, the annual death-rate from other diseases had fallen from 847 to 585.

Answers to the third question.

With regard to the possible mischief of bad vaccination, there is somewhat less uniformity of tone; partly, perhaps, because of the real difficulty of the subject; but chiefly, because in answering the third question more expression has been given to speculative opinions. A few respondents (apparently on theoretical grounds) think that a vaccinator who improperly derives his lymph from an impure source may thereby invaccinate some second and unintended specific infection. A very few even believe they have seen instances of the kind. But, generally speaking, opinion and experience declare themselves in the opposite sense, and render it in the highest degree probable that, in the isolated instances to which reference is made, there may have operated those sources of fallacy to which I have adverted. Not only the very much greater volume of statement, but a really immense weight of authority, is on the side of those experimental results which I quoted to you. Men of the largest and oldest consulting practice in the United Kingdom—men who are believed to have seen every variety of disease and accident to which the human body is liable—our leaders who have taught medicine and surgery to the mass of the profession—physicians and surgeons of our largest metropolitan and provincial hospitals in England, Scotland, and Ireland—physicians who have specially studied the diseases of infancy—surgeons who have specially studied the inoculative diseases—pathologists of distinguished insight and learning—have never in their experience "had reason to believe or suspect" an opposite conclusion to that of M. Taupin's experiments. In the alphabetical series of opinions you will read familiar British names, dozen by dozen, standing beside assertions of this kind. You will read that equally negative in Paris has been the vast experience of Chomel and Moreau and Rayer and Ricord and Rostan and Velpeau; equally negative at Vienna, that of Hebra, Oppolzer and Sigmund. Obviously, then, one at least of two conclusions is inevitable. Either it is the case that—even with reprehensible carelessness as to the source of lymph—vaccination (so long as in any sense of the word it is vaccination) cannot be the means of communicating any second infection. Or else it is the case that, in the world of vaccinators, care is almost universally taken to exclude that possibility of danger. To the public perhaps it matters little which of these conclusions is true. Analogies and experiments, as I have shown, speak almost decidedly for the former. But at least there can be no objection to superfluous precaution. And, in reading the answers written by gentlemen personally engaged in vaccination, you will be glad to observe how many of them, in referring to a possible slovenliness in this matter, speak of it as something which cannot be conceived of any decent practitioner.

Answers to the fourth question.

Answers to my fourth and last question are, for all practical purposes, summaries of opinion on the whole subject. For no person—you may be sure—will recommend the universal practice of vaccination, while he doubts its protective influence; nor while (like M. Verdé de Lisle) he regards small-pox as a "sublime crisis," which it is requisite for human health to undergo; nor while he considers that the success of vaccination, in extinguishing that horrible distemper, must develop other varieties of untimely death; nor even while he believes that, in its ordinary practice by competent persons, there are risks of casually inoculating other combined infections. *To recommend* that, *except for special reasons in individual cases, vaccination* (skilful, of course) *shall be universally practised*, is to imply that one's mind is made up on all those subjects. And such, you will observe, is the recommendation—with only two personal exceptions, the unanimous recommendation—of every individual and every Government in the series.

Wonderful unanimity of the answers.

Looking, then, to the whole succession of answers, and describing in few words what to myself has been the effect of perusing them, I would say that—above all—I am struck with their concord.

Two hundred and thirty years have elapsed, since Harvey first taught the circulation of the blood. The first announcement of Jenner's discovery was within the adult memory of men still living. Yet I believe that questions addressed to the Governments of Europe, and to 542 professors and practitioners of medicine with respect to the older truth—basis though it has long become of all physiological teaching—would not elicit more unanimous replies than these which record the triumphant successes of vaccination.

It can be no common certainty which commands so general an assent. It can have been neither a truthless nor a barren doctrine, which, within sixty years from its rise, has all but universally satisfied private judgment, and has converted nations to be its grateful followers.

Inevitability of some dissent.

No truth can be thought of, against which some one does not rail. And it would be idle to hope, under existing conditions of the human mind, that vaccination should be much more generally credited than it is.

Perhaps in no age of the world have persons, in proportion to their instruction, been readier than now to accept physical marvels, and to modify their conception of natural laws, at the bidding of quacks and conjurers. It goes with this credulity to be incredulous of proved truth. Alike in rejecting what is known, and in believing what is preposterous, the rights of private foolishness assert themselves. It is but the same impotence of judgment, which shrinks from embracing what is real, and lavishes itself upon clouds of fiction.

To some extent, therefore, it may be felt a weary and unprofitable work to have spent time and labour in re-asserting proofs which, fifty years ago, were exhaustive of the subject; and many eminent men who have favoured me with their assistance may grudge to have given it against superannuated error.

Their interest as a conclusive estimate of Jenner's services to mankind.

Yet if, in final acknowledgment of this assistance, I might be permitted to express what —far better than any thanks of mine—may requite those respected contributors for the trouble they have incurred, I would say that they have given to Jenner the monument which, beyond any other, he would have prized.

They have enabled you to estimate the full measure of gratitude which is due to the discoverer of vaccination. They have set before you, as experience, what it must have seemed mere enthusiasm to foretell. You will read it in the skilled evidence of individuals who, solely with the resources of Jenner's antidote, are maintaining day by day against the most dreadful of infections the victory which he commenced. You will read it in the colossal statistics of nations which, till sixty years ago, were still decimated by that one messenger of death.

If utility to human life be any test of what is noble in labour—if our teacher of inductive philosophy have rightly advised us, *non tantum veritati et ordini, verum etiam usui et commodis hominum consulere*—then assuredly the discovery, of which those things are told, may rank with any achievement of man.

"Let men rejoice that there has shone so great a splendor from amid their race" is the bidding, which at Newton's tomb reminds us of immortal debts to the greatest interpreter of nature, and claims kindred for us with the power of his intellect, passionless and "almost divine." If corresponding honour be due to the most beneficent application of science—if our mortal state owes love to those who lessen its weakness and its misery—surely here has been a second student of nature, who—also matchless in his career—might have claimed to lie beside that monarch of the intellect in his last repose, and to share the inadequate homage of that grateful epitaph.

For, though a different, it is an equal praise, which the members of Jenner's profession vindicate for his honoured name. He too could interpret nature: but, above all, he could render her teaching fruitful. To arm mankind against the worst of pestilences—to widen by one discovery the horizon of human life — to banish a cruel terror from every mother's heart;—such was Jenner's aspiration in his study of nature:—such has been the fruit of his philosophy.

Members of his profession consider it their noblest vocation to imitate the endeavours which led him to this transcendent result; and I believe that they—whose contributions to the following pages I respectfully lay before you — will have felt almost a filial pride in expressing their knowledge of facts which consecrate Jenner's place in history.

I have the honour to be, Sir,
Your obedient servant,
JOHN SIMON.

Whitehall, May 9th, 1857.

APPENDIX.

A.

EVIDENCE given before a Committee of the House of Commons, March 22, 1802, by DR. JENNER.

MY inquiry into the nature of the cow-pox commenced upwards of twenty-five years ago. My attention to this singular disease was first excited by observing that among those whom in the country I was frequently called upon to inoculate, many resisted every effort to give them the small-pox. These patients, I found, had undergone a disease they called cow-pox, contracted by milking cows affected with a peculiar eruption on their teats. On inquiry, it appeared that it had been known among the dairies time immemorial, and that a vague opinion prevailed that it was a preventive of the small-pox. This opinion I found was comparatively new among them; for all the older farmers declared they had no such idea in their early days; a circumstance that seemed easily to be accounted for, from my knowing that the common people were very rarely inoculated for the small-pox till that practice was rendered general by the improved method introduced by the Suttons, so that the working people in the dairies were seldom put to the test of the preventive powers of the cow-pox.

In the course of the investigation of this subject, which, like all others of a complex and intricate nature, presented many difficulties, I found that some of those *who seemed to have undergone the cow-pox*, nevertheless, on inoculation with the small-pox, felt its influence just the same as if no disease had been communicated to them by the cow. This occurrence led me to make inquiry among the practitioners in the country around me, few of whom were acquainted with the disease, but all agreed in this sentiment, that the cow-pox was not to be relied upon as a certain preventive of the small-pox. This for a while damped, but did not extinguish, my ardour; for, as I proceeded, I had the satisfaction to learn that the cow was subject to some varieties of spontaneous eruptions upon her teats; that they were all capable of communicating sores to the hands of the milkers, and that whatever sore was derived from the animal was called in the dairy the cow-pox. Thus, I surmounted a great obstacle, and in consequence was led to form a distinction between these diseases; one of which only I have denominated the *true*, the other the *spurious*, cowpox; the latter not possessing any specific power over the constitution. This impediment to my progress was not long removed before another, of far greater magnitude in its appearance, started up.

There were not wanting instances to prove, that when the *true* cow-pox broke out among the cattle at a dairy, a person who had milked an infected animal, and had thereby apparently gone through the disease in common with others, was liable to receive the small-pox afterwards. This, like the former obstacle, gave a painful check to my fond and aspiring hopes; but reflecting that the operations of nature are generally uniform, and that it was not probable the human constitution, having undergone the cow-pox, should in some instances be perfectly shielded from the small-pox, and in many others remain unprotected, I resumed my labours with redoubled ardour. The result was fortunate; for I now discovered that the virus of cow-pox was liable to undergo progressive changes from the same causes precisely as that of small-pox, and that when it was applied to the human skin in its degenerated state, it would produce the ulcerative effects in as great a degree as when it was not decomposed, and sometimes far greater; but having lost *its specific properties*, it was incapable of producing that change upon the human frame which is requisite to render it unsusceptible of the variolous contagion; so that it became evident that a person might milk a cow one day, and, having caught the disease, be for ever secure; while another person, milking the same cow the next day, might feel the influence of the virus in such a way as to produce a sore or sores, and in consequence of this might experience an indisposition to a considerable extent; yet, as has been observed, the specific quality being lost, the constitution would receive no peculiar impression.

Here the close analogy between the virus of small-pox and of cow-pox becomes remarkably conspicuous: since the former, when taken from a recent pustule and immediately used, gives the perfect small-pox to the person on whom it is inoculated; but when taken in a far advanced stage of the disease, or when (although taken early) previously to its insertion, it may be exposed to such agents as, according the established laws of nature, cause its decomposition, it can no longer be relied on as effectual. This observation will fully explain the source of those errors which have been committed by many inoculators of the cow-pox. Conceiving the whole process to be so extremely simple as not to admit of a mistake, they have been heedless about the state of the vaccine virus; and finding it limpid, as part of it will be, even in an advanced state of the pustule, when the greater portion has been converted into a scab, they have felt an improper confidence, and sometimes mistaken a spurious pustule, which the vaccine fluid in this state is capable of exciting, for that which possesses the perfect character.

During the investigation of the casual cow-pox, I was struck with the idea that it might be practicable to propagate the disease by inoculation, after the manner of the small-pox, first from the cow, and finally from one human being to another. I anxiously waited some time for an opportunity of putting this theory to the test. At length the period arrived. The first experiment was made upon a lad of the name of Phipps, in the spring of the year 1796, in whose arm a little vaccine virus was inserted, taken from the hand of a young woman who had been accidentally infected by a cow. Notwithstanding the resemblance which the pustule, thus excited on the boy's arm, bore to variolous inoculation, yet, as the indisposition attending it was barely perceptible, I could scarcely persuade myself the patient was secure from the small-pox. However, on his being inoculated some months afterwards, it proved that he was secure.* This case inspired me with confidence; and as soon as I could again furnish myself with virus from the cow, I made an arrangement for a series of inoculations. A number of children were inoculated in succession one from the other; and after several months had elapsed they were exposed to the infection of the small-pox, some by inoculation, others by variolous effluvia, and some in both ways; but they all resisted it.

The result of these trials gradually led me into a wider field of experiment, which I went over, not only with great attention, but with painful solicitude. This became universally known through a treatise published in June 1798. The result of my further experience was also brought forward in subsequent publications in the two succeeding years 1799 and 1800. The distrust and scepticism which naturally arose in the minds of medical men, on my first announcing so unexpected a discovery, has now nearly disappeared. Many hundreds of them, from actual experience, have given their attestations that the inoculated cow pox proves a perfect security against the small-pox; and I shall probably be within compass if I say, thousands are ready to follow their example, for the scope that this inoculation has now taken is immense. 100,000 persons, upon the smallest computation, have been inoculated in these realms. The numbers who have partaken of its benefits throughout Europe and other parts of the globe are incalculable; and it now becomes too manifest to admit of controversy, that the annihilation of the small pox, the most dreadful scourge of the human species, must be the final result of this practice.

B.

REPORT from the COMMITTEE on Dr. JENNER'S PETITION to the House of Commons.

THE Committee to whom the Petition of Edward Jenner, Doctor of Physic, was referred

Have, pursuant to the Order of the House, examined the matter thereof; which is divided into three distinct heads of inquiry:—

1. The utility of the discovery itself, which is the foundation of the Petition;
2. The right of the Petitioner to claim the discovery;
3. The advantage, in point of medical practice and pecuniary emolument, which he has derived from it.

Upon the first head a number of witnesses of the highest characters and most extensive experience in the profession were examined, whose names, with the substance of their respective evidence (strongly confirmed by their general practice, as well as by that in their own families) appear in the Supplement; nor was it for want of the testimony of several other equally respectable physicians and surgeons, whom the Petitioner was desirous of producing, that many other names are not inserted; but because your Committee, after having received so considerable a body of evidence to the same purport, and with so little variation in opinion, thought that his case could sustain no injury in being left to rest upon the concurring depositions of those already examined, who had both the most ample experience of the facts, and the best means of forming a judgment upon them. The testimony, also, of some persons not professional has been admitted, who could speak to occurrences that tend to illustrate particular points connected with the subject. The result, as it appears to your Committee, which may be collected from the oral testimony of these gentlemen (with the exception of three of them) is, that the discovery of vaccine inoculation is of the most general utility, inasmuch as it introduces a milder disorder in the place of the inoculated small-pox, which is not capable of being communicated by contagion; that it does not excite other humours or disorders in the constitution; that it has not been known, in any one instance, to prove fatal; that the inoculation may be safely performed at all times of life (which is known not to be the case with regard to the inoculation of the small-pox) in the earliest infancy, as well as during pregnancy, and in old age; and that it tends to eradicate, and, if its use becomes universal, must absolutely extinguish, one of the most destructive disorders by which the human race has been visited.

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* This boy was again inoculated nearly five years afterwards, with variolous matter, but no other effect was produced beyond a local inflammation around the punctured part upon the arm.

The written evidence which is inserted in the Supplement (for your Committee have judged it proper to make a selection, from a great mass, of what appeared most important) is more various, but directed to the same objects: part of it relates to the very extensive and successful practice of this mode of inoculation in every quarter of the globe, the efficacy of which does not seem abated by the cold of the northern, nor by the heat of the southern and tropical climates; and though there are no means of examining the authors from whence these attestations come, it would be an act of injustice to the Petitioner to exclude such important documents, which show the consideration in which this discovery is held, and the benefit with which it has been attended in so many other countries, to at least as great an extent as in our own.

As a comparison between this new practice and the inoculated small-pox forms a principal consideration in the present inquiry, some facts with regard to the latter engaged the attention of your Committee, and in the supplement are inserted (see page 147) statements of the mortality occasioned by the small-pox in 42 years before inoculation was practised in England, and of the 42 years from 1731 to 1772; the result of which appears to be an increase of deaths amounting to 17 in every 1,000; the general average giving 72 in every 1,000 during the first 42 years, and 89 in the 42 years ending with 1772, so as to make the whole excess of deaths in the latter period 1,742. The increase of mortality is stated by another witness (No. 10) to be as 95 to 74, comparing the concluding 30 years with the first 30 of the last century, and the average annual mortality from small-pox to have been latterly about 2,000; for though individual lives are certainly preserved, and it is true that a smaller loss happens in equal numbers who undergo the small-pox now than there was formerly, yet it must be admitted that the general prevalence of inoculation tends to spread and multiply the disease itself: of which, though the violence be much abated by the present mode of treatment, the contagious quality remains in full force. It deserves also to be noticed, that the deaths under the inoculated sort of small-pox, with all the improvements of modern experience, are not inconsiderable; it is stated by one of the witnesses at about 1 in every 300 throughout England (Nos. 5 and 7); by another, as about 1 in every 100 in London (No. 15); while the loss in the natural small-pox is probably not less than 1 in 6 (No. 8). Nor ought it to be overlooked, that mistakes have been known to arise in the inoculated small-pox, and instances are cited by some of the witnesses in which persons supposed to have gone through the small-pox by inoculation have caught it afterwards in the natural way (Nos. 28 and 39). The general law of vaccine and variolous disease are extremely similar, and it is not surprising that they should resemble each other in their anomalies.

A spurious or imperfect sort of cow-pox having been mentioned in some of the examinations, your Committee have been particularly diligent in their inquiries into every individual case that came within their notice, where suspicions had arisen, or facts were alleged tending to bring into doubt the preventive power of vaccine inoculation; and although, for the reasons before given, they have restricted and abridged the proofs in favour of this practice, they have thought proper to withhold no part of the evidence that has been received relative to the cases that appear to controvert it; of which it will be observed that some (Nos. 6, 17, and 24) evidently resolve themselves into variolous infection, taken previously to the vaccine inoculation; others (Nos. 6 and 23) into the patient not having taken the cow-pox at all; others again (Nos. 10 and 48) from the vaccine matter being, by want of attention in preserving it, decomposed, or mixed with variolous matter (Nos. 38 and 48), or from the fluid being taken at too late a period of the pustule; to which last cause it seems probable that most of the errors and dubious cases are to be referred (Nos. 10, 11, and 38). All the practitioners agree that there is no difficulty in distinguishing the real disorder from every spurious or imperfect appearance, and that the regular progress of the pustule itself, if attended to, cannot be mistaken.

Some cases (Nos. 40 and 42) are not explained in a manner so satisfactory and indisputable as the foregoing, but in leaving them to have such weight as they may appear to deserve, your committee cannot avoid recurring to the multitude of instances in which endeavours have been used to communicate the small-pox to patients who have been known to go through the regular vaccine disease, in which neither repeated inoculations, nor exposure to the most malignant small-pox, have been able to produce any effect, Nos. 5, 9, 14, 15, 19, 27, 32, and 39.

Upon the second head the whole of the oral depositions, as well as all the written documents from abroad, are uniform and decisive in favour of Dr. Jenner's claim to originality in the discovery; but as some pretensions have been advanced to a knowledge at least of this practice before Dr. Jenner's publications, it may be proper to notice shortly what the nature of those claims is, and in what manner they bear upon this part of the Petitioner's case. Such extracts as can be considered in any degree material are contained in pages 155, 156, and 159. The disorder itself and its specific property of securing against small-pox infection was not a discovery of Dr. Jenner, nor of any of those whose writings are referred to, for in various parts of England, in Gloucestershire and Devonshire particularly, there was an opinion of that sort current among the common people employed in dairies, which the observation of inoculators for the small-pox tended to confirm. It appears not improbable that, in some very rare instances, this knowledge was carried one step farther, and that the cow-pox was communicated either by handling the teat or by inoculation from the animal for the purpose and with the intention of securing against the danger of small-pox; but the practice of which Dr. Jenner asserts himself to be the original inventor is the inoculation from one human being to another, and the mode of transferring indefinitely the vaccine matter without any diminution of its specific power, to which it does not appear that any person has ever alleged a title; and these papers and experiments, whatever accuracy of observation and spirit of research they may evince in their respective authors, and to whatever extent they may be supposed to go, as they were never given to the public, so neither is there any intimation that they were imparted to Dr. Jenner; nor is it contended that the world became acquainted with this discovery by any other means than by the course of trials conducted by the Petitioner, and by his ample and unreserved communications.

Upon the last division of the subject evidence has been received from persons who were acquainted with the medical practice and former situation of Dr. Jenner (No. 23), which confirms the allegation contained in the Petition, that he has not only reaped no advantage from his discovery, but that he has been a considerable loser by the persevering attention which he has bestowed upon this one subject to the neglect of his other business, and without an opportunity of replacing himself in the situation, which a desire of publishing and diffusing more extensively, and establishing beyond the reach of controversy, the practice itself, induced him to quit. What his gains might probably have been if he had been solicitous to keep the secret within his own practice and that of his immediate pupils, as far as medical men in great practice themselves can form a conjectural opinion, may be collected from the testimonies expressed in Nos. 7 and 30, in which no more than justice is done to the liberality and public spirit of the Petitioner in pursuing the propagation and extension of this important discovery, and in rendering it rather of universal utility to the human race than of emolument to himself.

C.

REPORT of the MEDICAL COUNCIL of the ROYAL JENNERIAN INSTITUTION, January 2, 1806.

THE Medical Council of the Royal Jennerian Institution, having been informed that various cases had occurred which excited prejudices against vaccine inoculation, and tended to check the progress of that important discovery in this kingdom, appointed a Committee of 25 of their members to inquire, not only into the nature and truth of such cases, but also into the evidence respecting instances of small-pox alleged to have occurred twice in the same person.

In consequence of this reference, the Committee made diligent inquiry into the history of a number of cases, in which it was supposed that vaccination had failed to prevent the small-pox, and also of such cases of small-pox as were stated to have happened subsequently to the natural or inoculated small-pox.

In the course of their examination the Committee learned that opinions and assertions had been advanced and circulated, which charged the cow-pox with rendering patients liable to particular diseases, frightful in their appearance, and hitherto unknown; and judging such opinions to be connected with the question as to the efficacy of the practice, they thought it incumbent upon them to examine also into the validity of these injurious statements respecting vaccination.

After a very minute investigation of these subjects, the result of their inquiries has been submitted to the Medical Council; and from the report of the Committee it appears:

I. That most of the cases which have been brought forward as instances of the failure of vaccination to prevent the small-pox, and which have been the subjects of public attention and conversation, are either wholly unfounded or grossly misrepresented.

II. That some of the cases are now allowed, by the very persons who first related them, to have been erroneously stated.

III. That the statements of such of those cases as are published have for the most part been carefully investigated, ably discussed, and fully refuted by different writers on the subject.

IV. That, notwithstanding the most incontestable proofs of such misrepresentations, a few medical men have persisted in repeatedly bringing the same unfounded and refuted reports and misrepresentations before the public; thus perversely and disingenuously labouring to excite prejudices against vaccination.

V. That in some printed accounts adverse to vaccination, in which the writers had no authenticated facts to support the opinions they advanced, nor any reasonable arguments to maintain them, the subject has been treated with indecent and disgusting levity; as if the good or evil of society were fit objects for sarcasm and ridicule.

VI. That when the practice of vaccination was first introduced and recommended by Dr. Jenner, many persons, who had never seen the effects of the vaccine fluid on the human system, who where almost wholly unacquainted with the history of vaccination, the characteristic marks of the genuine vesicle, and the cautions necessary to be observed in the management of it, and were therefore incompetent to decide whether patients were properly vaccinated or not, nevertheless ventured to inoculate for the cow-pox.

VII. That many persons have been declared duly vaccinated, when the operation was performed in a very negligent and unskilful manner, and when the inoculator did not afterwards see the patients, and therefore could not ascertain whether infection had taken place or not; and that to this cause are certainly to be attributed many of the cases adduced in proof of the inefficacy of the cow-pox.

VIII. That some cases have been brought before the Committee, on which they could form no decisive opinion, from the want of necessary information as to the regularity of the preceding vaccination, or the reality of the subsequent appearance of the small-pox.

IX. That it is admitted by the Committee, that a few cases have been brought before them, of persons having the small-pox, who had apparently passed through the cow-pox in a regular way.

X. That cases, supported by evidence equally strong, have been also brought before them, of persons who after having once regularly passed through the small-pox, either by inoculation or natural infection, have had that disease a second time.

XI. That in many cases, in which the small-pox has occurred a second time after inoculation or the natural disease, such recurrence has been particularly severe, and often fatal; whereas, when it has appeared to occur after vaccination, the disease has generally been so mild as to lose some of its characteristic marks, and even sometimes to render its existence doubtful.

XII. That it is a fact well ascertained, that in some particular states of certain constitutions, whether vaccine or variolous matter be employed, a local disease only will be excited by inoculation, the constitution remaining unaffected; yet that matter taken from such local vaccine or variolous pustule is capable of producing a general and perfect disease.

XIII. That if a person bearing the strongest and most indubitable marks of having had the small-pox, be repeatedly inoculated for that disease, a pustule may be produced, the matter of which will communicate the disease to those who have not been previously infected.

XIV. That although it is difficult to determine precisely the number of exceptions to the practice, the Medical Council are fully convinced that the failure of vaccination, as a preventive of the small-pox, is a *very rare* occurrence.

XV. That of the immense number who have been vaccinated in the army and navy, in different parts of the United Kingdom, and in every quarter of the globe, scarcely any instances of such failure have been reported to the Committee, but those which are said to have occurred in the metropolis or its vicinity.

XVI. That the Medical Council are fully assured that in very many places in which the small-pox raged with great violence, the disease has been speedily and effectually arrested in its progress, and in some populous cities wholly exterminated, by the practice of vaccination.

XVII. That the practice of inoculation for the small-pox, on its first introduction into this country, was opposed and very much retarded, in consequence of misrepresentations and arguments drawn from assumed facts, and of miscarriages arising from the want of correct information, similar to those now brought forward against vaccination; so that nearly 50 years elapsed before small-pox inoculation was fully established.

XVIII. That, by a reference to the bills of mortality, it will appear that, to the unfortunate neglect of vaccination, and to the prejudices raised against it, we may, in a great measure, attribute the loss of nearly 2000 lives by the small-pox, in this metropolis alone, within the present year.

XIX. That the few instances of failure, either in the inoculation of the cow-pox or of the small-pox, ought not to be considered as objections to either practice, but merely as deviations from the usual course of nature.

XX. That if a comparison be made between the preservative effects of vaccination, and those of inoculation for the small-pox, it would be necessary to take into account the greater number of persons who have been vaccinated within a given time; as it is probable that, within the last 7 years, nearly as many persons have been inoculated for the cow-pox as were ever inoculated for the small-pox, since the practice was introduced into this kingdom.

XXI. That, from all the facts which they have been able to collect, it appears to the Medical Council, that the cow-pox is generally mild and harmless in its effects; and that the few cases which have been alleged against this opinion may be fairly attributed to peculiarities of constitution.

XXII. That many well-known cutaneous diseases, and some scrofulous complaints, have been represented as the effects of vaccine inoculation, when in fact they originated from other causes, and in many instances occurred long after vaccination; and that such diseases are infinitely less frequent after vaccination, than after either the natural or inoculated small-pox.

Having stated these facts, and made these observations, the Medical Council cannot conclude their report upon a subject so highly important and interesting to all classes of the community, without making this *solemn Declaration:*

That, in their opinion, founded on their own individual experience, and the information which they have been able to collect from others, mankind have already derived great and incalculable benefit from the discovery of vaccination: and it is their full belief, that the sanguine expectations of advantage, and security, which have been formed from the inoculation of the cow-pox, will be ultimately and completely fulfilled.

(Signed.)
Edward Jenner, M.D., President of the Council.
J. C. Lettsom, M.D., V.P.
John Ring, V.P.
Joseph Adams, M.D.
John Addington.
C. R. Aikin.
Wm. Babington, M.D.
M. Baillie, M.D.
W. Blair.
Gil. Blane, M.D.
Isaac Buxton, M.D.
Wm. Chamberlaine.
John Clarke, M.D.
Astley Cooper.
Wm. Daniel Cordell.
Richard Croft, M.D.
Tho. Denman, M.D.
John Dinsdale.
Henry Field.
Edward Ford.
Joseph Fox.
Wm. M. Fraser, M.D.
William Gaitskell.
Wm. Hamilton, M.D.
John Hingestone.
Everard Home.
Robert Hooper, M.D.
Joseph Hurlock.
John Jones.
Thomas Key.
Francis Knight.
E. Leese.
L. Leese.
William Lewis.
William Lister, M.D.
Alex. Marcet, M.D.
Jos. Hart Myers, M.D.
Jas. Parkinson.
Thos. Paytherus.
John Pearson.
George Rees, M.D.
John Gibbs Ridout.
J. Squire, M.D.
Jas. Upton.
J. Christian Wachsell.
Thos. Walshman, M.D.
Robert Willan, M.D.
Allen Williams.
James Wilson.
J. Yelloly, M.D.

January 2, 1806.

John Walker,
Secretary to the Council.

D.

REPORT of the ROYAL COLLEGE of PHYSICIANS of LONDON on VACCINATION.

(Ordered to be printed by the House of Commons, 8th July 1807.)

THE Royal College of Physicians of London, having received His Majesty's commands, in compliance with an Address from the House of Commons, "to inquire into the state of vaccine inoculation in the "United Kingdom, to report their opinion and observations upon that practice, upon the evidence which has "been adduced in its support, and upon the causes which have hitherto retarded its general adoption," have applied themselves diligently to the business referred to them.

Deeply impressed with the importance of an inquiry which equally involves the lives of individuals and the public prosperity, they have made every exertion to investigate the subject fully and impartially. In aid of the knowledge and experience of the members of their own body they have applied separately to each of the Licentiates of the College; they have corresponded with the Colleges of Physicians of Dublin and Edinburgh —with the Colleges of Surgeons of London, Edinburgh, and Dublin; they have called upon the societies established for vaccination for an account of their practice, to what extent it has been carried on, and what has been the result of their experience; and they have, by public notice, invited individuals to contribute whatever information they had severally collected. They have, in consequence, been furnished with a mass of evidence, communicated with the greatest readiness and candour, which enables them to speak with confidence upon all the principal points referred to them.

I. During eight years which have elapsed since Dr. Jenner made his discovery public, the progress of vaccination has been rapid, not only in all parts of the United Kingdom, but in every quarter of the civilized world. In the British islands some hundred thousands have been vaccinated; in our possessions in the East Indies upwards of 800,000; and among the nations of Europe the practice has become general. Professional men have submitted it to the fairest trials, and the public have, for the most part, received it without prejudice. A few, indeed, have stood forth the adversaries of vaccination, on the same grounds as their predecessors who opposed the inoculation for the small-pox, falsely led by hypothetical reasoning in the investigation of a subject which must be supported or rejected upon facts and observations only. With these few exceptions the testimony in favour of vaccination has been most strong and satisfactory, and the practice of it, though it has received a check in some quarters, appears still to be upon the increase in most parts of the United Kingdom.

II. The College of Physicians, in giving their observations and opinions on the practice of vaccination, think it right to premise, that they advance nothing but what is supported by the multiplied and unequivocal evidence which has been brought before them, and they have not considered any facts as proved but what have been stated from actual observation.

Vaccination appears to be, in general, perfectly safe, the instances to the contrary being extremely rare. The disease excited by it is slight, and seldom prevents those under it from following their ordinary occupations. It has been communicated with safety to pregnant women, to children during dentition, and in their earliest infancy. In all respects it possesses material advantages over inoculation for the small-pox, which, though productive of a disease generally mild, yet sometimes occasions alarming symptoms, and is, in a few cases, fatal.

The security derived from vaccination against the small-pox, if not absolutely perfect, is as nearly so as can perhaps be expected from any human discovery; for among several hundred thousand cases, with the results of which the College have been made acquainted, the number of alleged failures has been surprisingly small, so much so as to form certainly no reasonable objection to the general adoption of vaccination; for it appears that there are not nearly so many failures in a given number of vaccinated persons as there are deaths in an equal number of persons inoculated for the small-pox. Nothing can more clearly demonstrate the superiority of vaccination over the inoculation of the small-pox than this consideration; and it is a most important fact, which has been confirmed in the course of this inquiry, that in almost every case where the small-pox has succeeded vaccination, whether by inoculation or by casual infection, the disease has varied much from its ordinary course; it has neither been the same in violence nor in the duration of its symptoms, but has, with very few exceptions, been remarkably mild, as if the small-pox had been deprived, by the previous vaccine disease, of all its usual malignity.

The testimonies before the College of Physicians are very decided in declaring that vaccination does less mischief to the constitution, and less frequently gives rise to other diseases, than the small-pox, either natural or inoculated.

The college feel themselves called upon to state this strongly, because it has been objected to vaccination that it produces new, unheard-of, and monstrous diseases. Of such assertions no proofs have been produced, and, after diligent inquiry, the College believe them to have been either the inventions of designing or the mistakes of ignorant men. In these respects, then, in its mildness, its safety, and its consequences, the individual may look for the peculiar advantages of vaccination. The benefits which flow from it to society are infinitely more considerable; *it spreads no infection, and can be communicated only by inoculation.* It is from a consideration of the pernicious effects of the small-pox that the real value of vaccination is to be estimated. The natural small-pox has been supposed to destroy a *sixth* part of all whom it attacks; and that even by inoculation, where that has been general in parishes and towns, about 1 in 300 has usually died.

It is not sufficiently known, or not adverted to, that nearly *one tenth*, some years more than one tenth, of the whole mortality of London, is occasioned by the small-pox; *and however beneficial the inoculation of the small-pox may have been to individuals, it appears to have kept up a constant source of contagion, which has been the means of increasing the number of deaths by what is called the natural disease. It cannot be doubted that this mischief has been extended by the inconsiderate manner in which great numbers of persons, even since the introduction of vaccination, are still every year inoculated with the small-pox, and afterwards required to attend two or three times a week at the places of inoculation*, through every stage of their illness.

From this, then, the public are to expect the great and uncontroverted superiority of vaccination, that it communicates no casual infection, and, while it is a protection to the individual, it is not prejudicial to the public.

III. The College of Physicians, in reporting their observations and opinions on the evidence adduced in support of vaccination, feel themselves authorized to state, that a body of evidence so large, so temperate, and so consistent, was perhaps never before collected upon any medical question. A discovery so novel, and to which there was nothing analogous in nature, though resting on the experimental observations of the inventor, was at first received with diffidence; it was not, however, difficult for others to repeat his experiment, by which the truth of his observations was confirmed and the doubts of the cautious were gradually dispelled by extensive experience. At the commencement of the practice, almost all that were vaccinated were afterwards submitted to the inoculation of the small-pox; many underwent this operation a second, and even a third time, and the uniform success of these trials quickly bred confidence in the new discovery. But the evidence of the security derived from vaccination against the small-pox does not rest alone upon those who afterwards underwent variolous inoculation, although amounting to many thousands; for it appears, from numerous observations communicated to the College, that those who have been vaccinated are equally secure against the contagion of epidemic small-pox. Towns, indeed, and districts of the country in which vaccination had been general, have afterwards had the small-pox prevalent on all sides of them without suffering from the contagion. There are also in the evidence a few examples of epidemic small-pox having been subdued by a general vaccination. It will not, therefore, appear extraordinary that many who have communicated their observations should state, that though at first they thought unfavourably of the practice, experience had now removed all their doubts.

It has been already mentioned that the evidence is not universally favourable, although it is in truth nearly so, for there are a few who entertain sentiments differing widely from those of the great majority of their brethren. The College, therefore, deemed it their duty in a particular manner to inquire upon what grounds and evidence the opposers of vaccination rested their opinions. From personal examination, as well as from their writings, they endeavoured to learn the full extent and weight of their objections. They found them without experience in vaccination, supporting their opinions by hearsay information, and hypothetical reasoning; and upon investigating the facts which they had advanced, they found them to be either misapprehended or misrepresented; or that they fell under the description of cases of imperfect small-pox before noticed, and which the College have endeavoured fairly to appreciate.

The practice of vaccination is but of eight years' standing, and its promoters, as well as opponents, must keep in mind that a period so short is too limited to ascertain every point, or to bring the art to that perfection of which it may be capable. The truth of this will readily be admitted by those acquainted with the history of inoculation for the small-pox. Vaccination is now, however, well understood, and its character accurately described. Some deviations from the usual course have occasionally occurred, which the author of the practice has called spurious cow-pox, by which the public have been misled, as if there were a true and a false cow-pox; but it appears that nothing more was meant than to express irregularity or difference from that common form and progress of the vaccine pustule from which its efficacy is inferred. Those who perform vaccination ought therefore to be well instructed, and should have watched with the greatest care the regular progress of the pustule, and learnt the most proper time for taking the matter. There is little doubt that some of the failures are to be imputed to the inexperience of the early vaccinators, and it is not unreasonable to expect that further observation will yet suggest many improvements that will reduce the number of anomalous cases, and furnish the means of determining with greater precision when the vaccine disease has been effectually received.

Though the College of Physicians have confined themselves in estimating the evidence to such facts as have occurred in their own country, because the accuracy of them could best be ascertained, they cannot be insensible to the confirmation these receive from the reports of the successful introduction of vaccination, not only into every part of Europe but throughout the vast continents of Asia and America.

IV. Several causes have had a partial operation in retarding the general adoption of vaccination. Some writers have greatly undervalued the security it affords, while others have considered it to be of a temporary nature only; but if any reliance is to be placed on the statements which have been laid before the College, its power of protecting the human body from the small-pox, though not perfect indeed, is abundantly sufficient to recommend it to the prudent and dispassionate, especially as the small-pox, in the few instances where it has subsequently occurred, has been generally mild and transient. The opinion that vaccination affords but a temporary security is supported by no analogy in nature, nor by the facts which have hitherto occurred. Although the experience of vaccine inoculation be only of a few years, yet the same disease, contracted by the milkers of cows, in some districts, has been long enough known to ascertain that in them, at least the unsusceptibility of the small-pox contagion does not wear out by time. Another cause is, the charge against vaccination of producing various new diseases of frightful and monstrous appearance.

Representations of some of these have been exhibited in prints in a way to alarm the feelings of parents, and to infuse dread and apprehension into the minds of the uninformed. Publications with such representations have been widely circulated, and, though they originate either in gross ignorance or wilful misrepresentation, yet have they lessened the confidence of many, particularly of the lower classes, in vaccination. No permanent effects, however, in retarding the progress of vaccination need be apprehended from such causes, for as soon as the public shall view them coolly and without surprise, they will excite contempt, and not fear.

Though the College of Physicians are of opinion that the progress of vaccination has been retarded in a few places by the above causes, yet they conceive that its general adoption has been prevented by causes far more powerful, and of a nature wholly different. The lower orders of society can hardly be induced to adopt precautions against evils which may be at a distance; nor can it be expected from them, if these precautions are attended with expense. Unless, therefore, from the immediate dread of epidemic small-pox, neither vaccination nor inoculation appear at any time to have been general, and when the cause of terror has passed by, the public have again relapsed into a state of indifference and apathy, and the salutary practice has come to a stand. It is not easy to suggest a remedy for an evil so deeply imprinted in human nature. To inform and instruct the public mind may do much, and it will probably be found that the progress of vaccination in different parts of the United Kingdom will be in proportion to that instruction. Were encouragement given to vaccination, by offering it to the poorer classes without expense, there is little doubt but it would in time supersede the inoculation for the small-pox, and thereby various sources of variolous infection would be cut off; but, till vaccination becomes general, it will be impossible to prevent the constant recurrence of the natural small-pox by means of those who are inoculated, except it should appear proper to the Legislature to adopt, in its wisdom, some measure by which those who still, from terror or prejudice, prefer the small-pox to the vaccine disease, may, in thus consulting the gratification of their own feelings, be prevented from doing mischief to their neighbours.

From the whole of the above considerations, the College of Physicians feel it their duty strongly to recommend the practice of vaccination. They have been led to this conclusion by no preconceived opinion, but by the most unbiassed judgment, formed from an irresistible weight of evidence which has been laid before them. For, when the number, the respectability, the disinterestedness, and the extensive experience of its advocates is compared with the feeble and imperfect testimonies of its few opposers; and when it is considered that many, who were once adverse to vaccination, have been convinced by further trials, and are now to be ranked among its warmest supporters, the truth seems to be established as firmly as the nature of such a question admits; so that the College of Physicians conceive that the public may reasonably look forward with some degree of hope to the time when all opposition shall cease, and the general concurrence of mankind shall at length be able to put an end to the ravages at least, if not to the existence, of the small-pox.

(Signed) LUCAS PEPYS,
President.

Royal College of Physicians,
10th April 1807.
JAS. HERVEY,
Registrar.

E.

On the PROTECTION against SMALL-POX afforded by VACCINATION, illustrated by the Returns of the Army, the Navy, and the Royal Military Asylum.—By T. GRAHAM BALFOUR, M.D., Surgeon to the Royal Military Asylum, Chelsea.

(*From the Medico-Chirurgical Transactions of the Royal Medical and Chirurgical Society of London*, Vol. xxxv.)

THE national importance of this question will, it is hoped, prove a sufficient apology for laying before the Society the following statistical evidence on the subject.

One of the principal difficulties in the investigation arises from the impossibility of ascertaining what proportion of the general population is unprotected by vaccination, or by a previous attack of small-pox. Our deductions have therefore been founded chiefly on the returns of the Army, the Navy, and the Royal Military Asylum, which contain the requisite information on that head.

ABSTRACT No. 1.

SHOWING the ADMISSIONS into HOSPITAL and DEATHS by Small-pox in the Army for the following periods:—

Stations of the Troops.		Periods of Observation.	Aggregate Strength.	Admitted into Hospital for Small-pox.	Died of Small-pox.
United Kingdom	Cavalry	10 years, 1837-46	54,374	52	2
	Foot Guards	do. do.	40,120	133	8
	Infantry	do. do.	160,103	372	46
Temperate Colonies.	Gibraltar	29 years, 1818-46	93,400	14	1
	Malta	30 „ 1817-46	61,998	30	3
	Ionian Islands	do. do.	96,494	6	1
	Bermudas	do. do.	22,945	1	—
	Nova Scotia and New Brunswick	do. do.	73,248	12	1
	Canada	do. do.	154,736	96	23
	Cape of Good Hope	29 years, 1818-46	54,291	1	—
Tropical Colonies.	Windward and Leeward Command	30 „ 1817-46	121,750	7	1
	Jamaica	do. do.	67,714	3	—
	Sierra Leone	18 years, 1819-36	1,843	—	—
	Mauritius	29 „ 1818-46	47,848	4	—
	Ceylon	30 „ 1817-46	58,397	12	7
	Moelmyne	10 „ 1827-36	6,818	2	—
	Madras—Europeans	5 „ 1834-38	45,378	7	2
Total		- - -	1,161,457	752	95

ABSTRACT No. II.

SHOWING the Number of CASES and of DEATHS by Small-pox in the Navy for the following periods:—

Naval Commands.	Periods of Observation.	Aggregate Strength.	Cases of Small-pox.	Deaths by Small-pox.
Home Force	14 years, 1830-43	57,293	83	2
"Various" Force*	do. do.	20,440	22	1
Mediterranean and Peninsular Station	do. do.	135,014	161	10
West Indian and North American do.	do. do.	49,047	22	3
Cape and West Coast of Africa	do. do.	24,761	57	10
East Indian Station	do. do.	40,512	43	9
South American do.	do. do.	36,303	29	1
Total	- - -	363,370	417	36

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* Under this term are included ships which, "though reckoned on home service are employed occasionally abroad in various detached duties, ships employed in carrying troops, ships fitting out and paying off, and packets while in England."

I. The Army.

There are no returns which show the actual number of soldiers who had been vaccinated or had small-pox, but a tolerably accurate approximation may be obtained in the following manner:—

From returns forwarded annually to the Army Medical Board it appears that, in the eight years from the 1st of April 1844 to the 31st of March 1851 inclusive, out of 90,092 recruits medically inspected at the head-quarters of recruiting districts, and found fit for service, 20,132 bore marks of small-pox; 64,096 had marks of vaccination; and 5,864 bore no distinct traces of either. By the rules of the service the last class would undergo vaccination immediately on joining their regiments, and consequently must be added to the number protected by vaccination; making a total of 69,060, or 78 per cent. of the whole, while 22 per cent. had previously been protected by small-pox. These proportions, having been ascertained from such extensive data, may fairly be held to represent the condition of the army as regards protection from this disease.

The question now arises, what has been the number of admissions into hospital and deaths by small-pox among a body of men thus protected? In Abstract No. I. of Appendix, this information will be found, as regards the troops at home for a period of ten years, and in the colonies of thirty years.

The following summary gives a condensed view of the results:—

Among Troops serving in	Aggregate Strength.	Cases of Small-pox.	Deaths by Small-pox.	Annual ratio per 1000 of strength.	
				Cases.	Deaths.
The United Kingdom - -	254,597	557	56	2·188	·220
Temperate Colonies - -	557,112	160	29	·287	·052
Tropical Colonies - -	314,131	28	8	·089	·025
Total - - -	1,125,840	745	93	·662	·083

This Table shows the proportion of cases to have been only 66, and the deaths 8 in every 100,000 men serving throughout the army. But the prevalence and mortality have varied in different portions of the force. Thus, the deaths have been four times as numerous among troops in the United Kingdom as in temperate colonies, and eight times as numerous as in tropical colonies; while a still greater disproportion is found to exist in the admissions into hospital.

The comparatively large amount of small-pox among troops at home is doubtless attributable to the men being chiefly quartered in the large towns from which it is scarcely ever absent, and also to the number of recruits who join their regiments after having been living in those densely-peopled localities, where they were most likely to be exposed to the contagion of that disease. This view is corroborated by the fact, that of the 56 deaths noted in the preceding Table, 9 occurred in London, 7 in Dublin, 6 in Glasgow, 5 in Cork, 3 in Manchester, and 2 each in Hull, Devonport, Bradford, Belfast, Newry, and Kilkenny, leaving only 14 for all the rest of the kingdom. Additional proof is afforded by the relative proportion occurring among young soldiers, to which we shall hereafter advert. Even taking the most unfavourable results, however, the mortality has only amounted to 2 in 10,000 of the force annually.

As the lower ratio of cases in the colonies may perhaps be attributed to the men being less frequently exposed to the contagion of the disease, it may not be out of place here to notice a few of the more striking instances in which, from the general prevalence of small-pox in the colony, they must have been so exposed. This is shown for the West Indies in the following Table:—

—	Black Troops.			White Troops.			Ratio per 1000 of Mean Strength.			
							Cases of Small-pox.		Deaths.	
	Mean Strength.	Admitted into Hospital for Small-pox.	Died.	Mean Strength.	Admitted into Hospital for Small-pox.	Died.	Black Troops.	White Troops.	Black Troops.	White Troops.
Trinidad, 1819	603	Not stated.	58	230	Not stated.	0	Not stated.	Not stated.	96·2	0
St. Lucia, 1819	613	Ditto.	33	131	Ditto.	0	Ditto.	Ditto.	53·8	0
Bahamas, 1829	751	65	12	19	0	0	86·5	0	16·	0

Thus, while small-pox in one instance literally decimated the black troops, not a single death occurred among the European soldiers quartered in the same garrison.

In Malta small-pox prevailed as an epidemic from March 1830 till August 1831, and again in 1838. The mortality caused by it among the military and civil population respectively was as follows:—

——			Strength.	Deaths from Small-pox.	Annual ratio of Deaths per 1000 of strength.
March 1830 to August 1831	18 months	Civil Population	101,962	1,169	7·6*
		Military - -	2,299	2	0·6*
April 1838 to March 1839	12 months	Civil Population	105,456	686	6·5
		Military - -	2,186	0	0·

While, therefore, the loss by small-pox among the civil population has, on the average of these two epidemics, amounted to 718 in 100,000, among the military, who as we have already shown are a protected class, it has only been in the proportion of 35 out of the same numbers.

In Ceylon 7,874 cases and 2,945 deaths by small-pox were recorded in 1819, in a population of about a million. In the same year only four cases, of which two proved fatal, occurred among 2,863 European soldiers, being in the ratio of 1·58 admissions and 0·8 deaths per 1,000 of the strength. Among the native troops (chiefly Malays, Africans, and natives of the Peninsula of India), a large proportion of whom were, owing to religious prejudices, unprotected by vaccination, 41 deaths occurred in a force of 4,081, being 9·8 per 1,000 of the strength.

The principal mortality by small-pox among the troops serving abroad was in Canada, where 23 of the deaths recorded in the preceding Table occurred. During the last ten years of the period over which the returns extend almost all the cases were in Quebec, Montreal, and Kingston, where the disease prevailed to a very great extent among the civil population. Omitting this command, the cases in the temperate colonies amounted only to 16·, and the deaths to 1·5 in every 100,000 men.

If the hypothesis be correct, that the protective power of vaccination becomes gradually weaker and at length dies out, we should naturally expect to find the mortality by small-pox greater among the old soldiers.

With a view to test this, we have traced the ages of the fatal cases occurring in the United Kingdom, and have also ascertained the numbers living at each age during the ten years 1837–46, as follows:—

——	Aggregate Strength at each Age.	Died by Small-pox.	Ratio of Deaths per 1000 of Strength.
Under 20 - -	43,833	15	·342
20 and under 25 - -	90,041	28	·311
25 „ 30 - -	49,285	3	·061
30 „ 35 - -	37,151	8	·2
35 „ 40 - -	25,017	1	·0
40 and upwards - -	9,270	—	—
Not known - -	—	1	—
Total - - -	254,597	56	·220

Although, probably owing to the limited numbers, there is an irregularity in the progression, the general tendency to diminish with advancing age is very strongly marked.

The fact, established by the recruiting returns, that 6½ per cent. of the recruits are wholly unprotected, affords a melancholy proof of the neglect of vaccination among the lower orders in this country, especially as it may also be inferred that of the 22 per cent. who have distinct marks of having had small-pox, a very inconsiderable proportion could have been protected by previous vaccination.

II. THE NAVY.

We have no means of ascertaining the relative proportions of men bearing marks of vaccination and of previous small-pox in this force, but as it is a standing order that all men and boys entering the service who have not satisfactory marks of either, shall be immediately vaccinated, we may look upon them as a completely protected class. In Abstract, No. II. of Appendix, will be found a detailed statement of the number of cases of small-pox in each of the naval commands, and of which the following is a summary:—

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* As the period included in this observation is a year and a half, it is of course necessary, in calculating the *annual* ratio of mortality either to add one half to the strength, or to deduct one third from the deaths.

——	Aggregate Strength.	Cases of Small-pox.	Deaths by Small-pox.	Annual ratio per 1000 of Strength.	
				Cases.	Deaths.
Home and "Various" Force - -	77,733	105	3	1·351	·038
Foreign Commands - - -	285,637	312	33	1·093	·115
Total - - - - -	363,370	417	36	1·148	·099

Thus, it appears that throughout the navy the cases of small-pox have averaged only 115 and the deaths 10 in every 100,000 men.

Considering the manner in which sailors are necessarily crowded on shipboard, and the consequent difficulty of separating the healthy from the sick, their exemption from a disease of so highly contagious a nature affords convincing evidence of the value of vaccination. In the West African squadron, in particular, they are often exposed to the disease, from its breaking out among the natives, who are employed in considerable numbers in working the ship, and who are seldom or never protected by vaccination. Notwithstanding this, only 57 cases and 10 deaths by small-pox occurred in an aggregate force of 24,761 men during the fourteen years 1830–43 inclusive.

III. The Royal Military Asylum.

Since the opening of this institution, in 1803, for the reception of orphans of soldiers, the vaccination register appears to have been kept with great care, and shows, in every instance, whether a boy, on admission into the establishment, bore marks of small-pox or cow-pox, or was subsequently vaccinated. Satisfactory evidence can, therefore, in this instance, be obtained that they were all protected. The cases that occurred among them up to the 31st of December 1851, were as follows:—

Period.	Aggregate Strength.	Cases of Small-pox.	Died.	Ratio per 1000 of Strength.	
				Cases.	Deaths.
48 Years - - - -	31,705	39	4	1·231	0·126

Thus, in a population completely protected, either by small-pox or vaccination, the cases have averaged 123, and the deaths 12½ in every 100,000, being a still lower proportion than in the army serving in the United Kingdom.

But we are enabled from the records of the asylum to obtain another description of proof of the efficacy of vaccination. Of 5774 boys taken on the strength of the establishment, from its opening in August 1803, to the 31st December 1851, 1950 are recorded as having marks of small-pox, 3636 marks of vaccination, and 188 no satisfactory mark of either. The last having been all vaccinated on admission, there were 1950 protected by previous small-pox, and 3824 by vaccination. Among these the cases of small-pox above recorded were distributed as follows:—

——	No. over whom Observations extend.	Of whom subsequently		Ratio per 1000.	
		Had Small-pox.	Died of Small-pox.	Cases.	Deaths.
Boys having marks of Small-pox -	1,950	12	4	6·15	2·05
" " Vaccination -	3,824	27	—	7·06	0·00

This table shows the protection afforded by vaccination against attacks of this disease, to be very little inferior to that afforded by previous small-pox; the difference in the prevalence among the two classes having been at the rate of only 9 cases in 10,000 boys, while it is remarkable that all the deaths were from secondary small-pox, not one having occurred among the vaccinated.

The preceding facts appear to afford most conclusive proof of the value of vaccination. The length of time and number of persons over whom the observations extend are sufficient to warrant reliance being placed on the results. In the army it has been ascertained that four fifths of the persons entering it are protected by vaccination. The navy, being manned from nearly the same class of the population, may be inferred to be protected in the same proportion, and two thirds of the boys admitted into the Royal Military Asylum have borne satisfactory marks. In all of them the remainder were protected by previous attacks of small-pox. The proportion of cases of this disease among a population thus protected has been as follows :—

Among every 100,000 Soldiers there have been 66 cases and 8 deaths.
" " Sailors " 105 " 5 "
" " Boys of the R.M. Asylum 123 " 12 "

These results are, on the whole, extremely satisfactory. It may be remarked that the class among whom the largest proportion of cases and deaths occurred was that in which the greatest number of cases was protected by previous small-pox; and, as before stated, that all the deaths in that class were of boys who had not been vaccinated.

The evidence now laid before the Society appears to have an important bearing on the proposition again to legalise inoculation. The additional chance of exemption from small-pox which would result from having undergone that disease would be very small. But to gain this slight advantage, what are the risks we must run? Even if every person inoculated were previously vaccinated, it cannot be doubted that in some instances the engrafted disease would prove fatal. We should consequently reduce to a certainty that which at present is contingent on the chance of the individual being exposed to contagion. Again, while so large a proportion of the population is unprotected by vaccination, it appears most unjustifiable, for the very slight advantage to be gained from it, to legalise a practice which must to a certainty perpetuate and spread a loathsome, and, in unprotected persons, a very fatal disease.

The results, however, not only point out what is inexpedient, but suggest what is advisable. They show the great exemption (not amounting, however, as was at one time anticipated, to absolute immunity) enjoyed by persons who have undergone vaccination, and thus point out the means of reducing the prevalence and mortality of small-pox to a mere cypher. Why, then, should not vaccination be made compulsory? It is true such a measure might be objected to as interfering with the liberty of the subject, but so, to a certain extent, do all measures relating to public health. The convenience and prejudices of the few must give way to the interest of the many. The law compels us to carry our drains into the main sewers, forbids us throw rubbish or carry any other nuisance into the streets, as was the custom of our forefathers, puts down or regulates with a high hand any trade supposed to be injurious to the health or admitted to be offensive to the senses of our neighbours, and even compels us, in some instances, to consume our smoke; why, then, should it not enforce a measure which must greatly reduce, if not altogether annihilate, one of the most loathsome diseases that flesh is heir to? Why should it not prevent the ignorant and the careless from remaining in a position calculated to spread death and misery, not only through the neighbourhood in which they reside, but through the length and breadth of the land? In our Factory Acts the principle is recognised of protecting the young and helpless against an amount of labour likely to prove injurious to them, and it would only be an extension of the same humane principle to afford them protection against a malady of so fatal a character.

To our profession the task appears especially to belong of extending the benefits of one of the greatest discoveries ever made. By our personal exertions in promoting, each in his own sphere, the spread of vaccination, and, by using our influence in every quarter, to impress upon Government the necessity for some such sanitary law, we shall best fulfil the highest and most important mission of our profession—the prevention of disease.

F.

An Analytical Examination of all the Cases admitted, during Sixteen Years, at the Small-pox and Vaccination Hospital, London; with a view to illustrate the Pathology of Small-pox, and the protective influence of Vaccination, in degrees varying according as the Vaccination has been perfectly or imperfectly performed.—By J. F. Marson, Resident Surgeon to the Small-pox and Vaccination Hospital, London.

(*From the Medico-Chirurgical Transactions of the Royal Medical and Chirurgical Society of London,* Vol. xxxvi.)

Within the last few years small-pox has been several times epidemic in London. Many vaccinated as well as unvaccinated persons have been attacked by it, and the public have become, in consequence, somewhat anxious about their security. I have, therefore, thought that the profession would be interested, and that they might possibly elicit useful information from the leading particulars, arranged and classified, of the patients admitted for sixteen years, at the Smallpox and Vaccination Hospital, London. During the period alluded to—1836 to 1851, inclusive—small-pox has been epidemic four times, viz., in 1838, 1844, 1848, and

1851, besides a short epidemic in the winter of 1840-1. Rather more than half of the patients admitted with small-pox into the hospital, have had the disease after having been vaccinated. The particulars of each patient were entered at the time in the register of the hospital, in the majority of instances by myself. Having analysed these records with minute accuracy and strict fidelity, I beg now to place the results before the Society.

The analysis will be found to have reference principally to the following points:—

1. Natural small-pox.
2. Small-pox after small-pox.
    - *a.* After natural small-pox.
    - *b.* „ inoculation.
3. Small-pox after vaccination.
    - *a.* Number of cicatrices.
    - *b.* Character of cicatrices.
    - *c.* Vaccinated, but without cicatrices.
4. Febrile eruptive diseases mistaken for small-pox.

No one could be long in attendance at the Small-pox Hospital, and fail to be struck by the remarkable difference presented to his notice between the vaccinated and unvaccinated patients, and also between the vaccinated cases themselves, some patients having small-pox in a mild form, wholly devoid of danger, whilst others have it in great severity, scarcely if at all lessened by the previous vaccination. Under these circumstances it became desirable to ascertain carefully, so far as possible, all the antecedents regarding the vaccination of each individual admitted, with a view of discovering, if possible, the cause of this difference, to be able to account for the extreme mildness of the disease in some cases, and the danger and unmitigated course, sometimes death, in others.

Small-pox in the unprotected, remains to this day as virulent as it perhaps ever was, destroying about one third of all whom it attacks, and is especially destructive to infantile life. Vaccination, when performed in infancy, affords almost complete protection against the fatality of small-pox up to the period of puberty. This disease does not usually occur after vaccination until several years have elapsed; at least, such is the general experience of the Small-pox Hospital, although there have been some instances to the contrary. The particulars unfortunately, of the progress of the vaccination, as observed by medical men, are but rarely noted at the time, and preserved,* so that when variola occurs it becomes necessary to trust to the accounts given of the vaccination by the patients themselves or their friends, and to observe carefully the appearance of the cicatrices left by the vaccination; small-pox occurring in the great majority of instances in persons between 15 and 30 years of age, the vaccination having been, with but few exceptions, performed in infancy. After this lapse of time from vaccination, the most trustworthy evidence we can generally obtain of its perfection is from the cicatrices, and this evidence I shall be able to show is a very good guide to the general amount of protection conferred by vaccination, if not to be depended on even in each individual case, it is so when the observation is extended and applied to the community at large. My intention in bringing this subject before the Society is not to dwell upon individual cases, except so far as they form one comprehensive whole; but to look at the subject in its widest grasp, to treat of the cases in the aggregate, by hundreds and by thousands, as they have occurred in hospital practice extended over a series of years. A few exceptional cases could perhaps be found to the rule of practice it will seem desirable to draw from the accompanying records; but these very exceptional cases have been the cause of complicating the subject so much when viewed from a limited range, that the profession have been in some doubt what to do, and what to recommend: to endeavour to set these doubts at rest, and to contribute to the public good by indicating how the practice of vaccination may be improved, is the aim of this communication.

It will, perhaps, be objected, and very properly, that the experience of an hospital, as regards the mortality, is not the best criterion by which to judge of the true value of vaccination. In this I would entirely agree, if the evidence rested alone on the mortality; such, however, is not the case. No one is more alive than myself to the great amount of evil, as well as the great amount of good attendant on hospitals; of evil from collecting the sick together in large numbers, and I would have been the last to have brought forward the experience gained in an hospital of the protective influence of vaccination, as observed in England, if a tithe of the same amount of information on this particular subject and collected in the same systematic way, were available from other sources; but, unfortunately, it is not.

Although the inferences drawn on any disease, from the mortality of hospitals exclusively, might fairly be objected to, for the reasons well explained by Mr. Farr, in the "Third Annual Report of the Registrar General," 8vo. p. 97, still these inferences are not without their value, as the class of cases reported on can generally be obtained in much larger numbers at hospitals than from any other source, and when allowances have been made, as I have made them, in reporting on the patients, and drawing the averages from them collectively at the Small-pox Hospital, we can arrive very nearly at the truth, the great object I have had before me in undertaking these inquiries. To obtain this point, all the patients have been entirely excluded, in calculating the averages, who were affected by superadded disease, just as much as if they had never been admitted into the hospital at all, and the deductions have been made from those who were seemingly affected by small-pox only. All practical men will readily admit that it is impossible, even in rural practice, to meet with a large number of cases of any one disease unmixed with and uninfluenced by other diseases. The same thing occurs in hospital practice. Patients suffering from other diseases are attacked by small-pox and die, who would recover from small-pox but for the injury done to the constitution by the previous disease; and although a large majority of the fatal cases from superadded disease, at the Small-pox Hospital, has undoubtedly arisen from erysipelas, gangrene, &c.,[*] the same thing, unfortunately, is taking place often at our general hospitals, as well as at the Small-pox Hospital, and has given occasion, within the last few years, for the production of papers on hospital diseases;[†] but, in general hospitals, the evil seems to be of less consequence,—or at all events is less thought of,—than at the Small-pox Hospital, because the deaths, and other results, do not there, as they do at the Small-pox Hospital, interfere with a great scientific and pathological question, namely, the protective influence of vaccination. Assuming, however, the Society will give me credit for being fully alive to these evils of hospitals, and for having used my utmost care to exclude, so far as possible, from my calculations of averages of mortality all cases affected specially by hospital mischief, as well as other forms of superadded disease, such as phthisis; the several *idiopathic* inflammations of vital organs, as pneumonia; puerperal fever,—a disease closely allied probably to erysipelas, if not identical with it, &c., &c.

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* There are records, posted alphabetically, of all the persons vaccinated at the Small-pox Hospital, from 1799 to 1838.

A most unfortunate and indirectly fatal complication is gonorrhœa, both in the male and female; to the latter more especially. From the inability of the patients to use ablution, carefully, themselves, to the parts affected once or twice daily, and from the extremely disagreeable nature of this duty for others to perform for them, the parts are not always kept properly clean, the consequence is they are very apt to become gangrenous; absorption of the gangrenous matter ensues, which is followed by pyæmia, phlebitis, the formation of large abscesses all over the body, in short, the usual train of evils produced by the absorption of a morbid animal poison: these cases have been included, of course, in the returns under the head of gangrene, but they would not have arisen had it not been for the gonorrhœa. Allowances having been thus made, the patients are described, as far as it is, perhaps, possible to describe them, as suffering from small-pox only, as much uninfluenced by other diseases as the same number of cases would be if taken from private and parochial practice, where the accommodation for the sick is often anything but favourable for their recovery, except in selected cases, which of course would not apply to the community at large, as this question ought to be applied, any more than hospital cases, so that when the remaining evils between hospital and private and parochial practice have been relatively balanced, the results would be perhaps nearly the same.

Viewing the question, then, as it actually occurs in practice, and to simplify and enable me to make my report on this large number of patients, 5,982, as clear and concise as appeared to me to be possible, they have been arranged annually for sixteen years on one systematic plan, and from these annual and other tables, altogether 87 tables, the whole have been combined, and finally formed into a series of six tables, comprising, it is hoped, most of the principal points of interest in the inquiry.

Of the series, the first table shows the number of patients admitted at the hospital in each year, distinguishing males from females, whether vaccinated or otherwise, and gives the outline of the disease under which each was suffering. It includes 185 cases of febrile diseases, principally eruptive, but not variolous, although sent to the hospital as such, and furnishes the result of the whole, with the rate per cent. of mortality.

The second table gives an analysis of all the cases of small-pox, viz. 5,797, classed under nine different headings, the form of the disease in each case, and the result, with the rate per cent. of mortality under each division.

The third table gives the ages of the unprotected patients, and the rate per cent. of mortality, calculated at different periods of life, for every five years up to thirty, and every ten years afterwards.

The fourth table further exhibits, separately, the leading particulars of 3,094 cases of small-pox after vaccination, showing, from a careful examination of each patient, the number and character of the vaccine cicatrices, the form of the variolous disease, and the result, with the rate per cent. of mortality from small-pox, after deducting the cases of superadded disease. It also shows the rate of mortality from small-pox in patients having one vaccine cicatrix, particularising whether good or indifferent, and the average; as well as with two, three, or more cicatrices; and of those reported to have been vaccinated, but who were without any cicatrix.

The fifth table shows, in quinquennial periods, the ages of the vaccinated patients when attacked by small-pox; *where* they were vaccinated, and the rate of mortality.

And the sixth table states, in periods of five years, the ages of the patients at the time they were vaccinated, who have subsequently been admitted with small-pox at the Small-pox Hospital.

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[*] Observations on Ochlesis, or the Disorder generated by the accumulation of the Sick, by George Gregory, M.D. "Medical Times," vol. xix. No. 496, p. 431.

[†] Cases of Hospital Gangrene, and of diffuse Inflammation of the Cellular Membrane, which occurred in St. Bartholomew's Hospital, in December 1846, and January 1847, by Holmes Coote, Esq. and Luther Holden, Esq. "Lancet," 1847. vol. i. p. 441. The Nature and Treatment of Erysipelas, being the subject for the Jacksonian Prize for the year 1849, by Peter Hinckes Bird, Esq. MS. Library of the Coll. of Surgeons.

There is probably no subject in the whole range of medical science to which the numerical method of investigation is more applicable than to the results obtained, and the effect produced on life by vaccination. At the present day it is unnecessary for me to dwell on its advantages over other modes of inquiry. It has, fortunately for the advancement of our art, taken the place in a great measure of hypothesis and mere opinion, which was of but little value, for the most part, on subjects of inquiry like the present, unsupported by any documentary evidence, compared with the exactness we arrive at by arranging and classifying a large number of kindred cases, and drawing our deductions from the whole. Much the same impression might have been, and doubtless was, often left on a careful, observant mind, but then other persons could not have been equally satisfied that the deductions drawn were the correct ones, as they can be when the cases and the particulars are placed numerically before them, and from which each inquirer can form his own opinions. The tables which I have thus arranged, and now present to the society, contain information which has occupied a portion of every day in collecting for sixteen years, and which may be combined and studied in a variety of ways. On some of the leading features of each table I will proceed to offer a few comments, taking them in the order of succession.

TABLE I.

Summary and General Classification of the Patients admitted annually at the Small-pox and Vaccination Hospital, London, during a Period of Sixteen Years, from 1836 to 1851, inclusive.

YEARS.	Number of patients.			Natural small-pox.		Small-pox after small-pox.		Small-pox after vaccination with and without cicatrices.		Small-pox after vaccination or inoculation.		Febrile diseases, principally eruptive, but not variolous, although sent to hospital as such.		RESULTS.					
														Discharged.	Died.				Rate per cent. of mortality.
	Males.	Females.	Total.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		Males.	Females.	Total.	Affected by superadded disease.	
1836	215	114	329	185	70	1	–	131	12	–	–	12	2	245	59	25	84	4	25·53
1837	156	95	251	142	44	–	–	97	1	–	–	12	1	205	31	15	46	5	18·32
1838	424	288	712	387	155	–	–	306	33	–	–	19	–	524	117	71	188	30	26·40
1839	102	53	155	61	22	–	–	83	4	1	1	10	–	128	16	11	27	1	17·41
1840	186	141	327	189	87	3	–	124	8	–	–	11	–	232	52	43	95	5	29·05
1841	209	148	357	189	64	2	1	151	10	–	–	15	–	282	51	24	75	5	21·00
1842	91	64	155	77	30	2	–	62	4	–	–	14	–	121	23	11	34	4	21·93
1843	92	68	160	77	27	2	–	69	—	–	–	12	–	133	21	6	27	3	16·87
1844	391	256	647	302	117	4	3	337	30	–	–	4	1	496	87	64	151	18	23·33
1845	240	144	384	137	63	4	–	227	15	–	–	16	1	305	54	25	79	3	20·57
1846	96	56	152	57	22	2	–	88	7	–	–	5	–	123	17	12	29	2	19·07
1847	270	191	461	167	50	8	3	275	28	–	–	11	–	380	49	32	81	10	17·57
1848	449	247	696	254	103	4	2	428	63	–	–	10	–	528	99	69	168	39	24·13
1849	123	77	200	71	22	4	–	115	11	–	–	10	–	167	22	11	33	5	16·50
1850	199	115	314	129	42	2	–	174	16	–	–	9	–	256	43	15	58	3	18·47
1851	438	244	682	230	78	9	–	427	26	1	–	15	–	578	64	40	104	9	15·24
Totals..	3,681	2,301	5,982	2,654	996	47	9	3,094	268	2	1	185	5	4,703	805	474	1,279	146	21·38

TABLE I.—The numbers admitted each year will be found to have fluctuated considerably, of course, in an hospital devoted to the reception of patients suffering from a disease liable to great variation from its epidemic character; so much so that during some years the admissions have been four or five times more numerous than in others. The total difference in the admission of males and females has been as three to two, three males to two females; the rate of mortality has been nearly the same, less by one per cent. only in females than in males. The average annual mortality has been 21 per cent., ranging between a minimum of 15 and a maximum of 29. And it will be found generally to have been greater in epidemic times, owing partly to the greater severity of the disease, and partly, probably, to the evil influence of collecting together, in a space too limited for them, a large number of sick persons. This will be rendered visible by observing the diminished mortality which has already taken place, during a severe epidemic since the new hospital at Highgate Hill has been in use, which is placed in a more healthy situation than the old hospital at Battle Bridge was, and where the space for patients is much larger, upwards of 2,000 cubic feet being allowed for each. The general sanitary arrangements are also much better. The new hospital came into use in July, 1850.* It ought, however, to be stated, that on three different occasions, during the epidemics of 1838-44-48, when it was impossible to receive, for want of room, all the applicants for admission, and in order to afford as much assistance to the public as possible, severe cases only were admitted, and many mild cases, after vaccination, recommended to find accommodation elsewhere. In this way the mortality at the hospital was necessarily increased, rendered greater per cent. than it would have been had all the applicants been admitted indiscriminately. It has, besides, frequently come to my knowledge at other times, that a severe case has been sent to the hospital,

whilst a mild case or two, in the same house, has been kept at home. This is only what might be expected, but it helps to account for the increased mortality there may be per cent. in hospitals from any given disease, over the mortality per cent. from the same disease amongst the public at large in private houses.

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* After having given considerable attention to the subject for several years, I have observed that the cubical space allowed for patients with small-pox, and like diseases, such as typhus, scarlatina, &c. should not be less than 2,000 cubic feet for each patient.

185 cases of febrile diseases, not variolous, have been admitted in the sixteen years, and about twice as many were seen on their arrival by the medical officers of the hospital prior to admission, and were not received; but as this does not in any way alter the order of frequency in which errors of diagnosis occurred with regard to the several mistaken diseases, it will probably be interesting to the Society to know the diseases which have been most commonly mistaken for small-pox. When arranged, they come under 21 different heads; but, as may be supposed, some diseases have misled much more frequently than others. Of the 185 cases, 50 were measles, 33 lichen febrilis, 30 varicella vera, 27 fever, making 140 of the 185. The next disease in order of frequency is urticaria, of which there were 8 cases. It will, therefore, be seen that measles, lichen, varicella, and fever, have led to mistakes much more frequently than any other diseases. Of the cases of fever, a few arose, in my opinion, from the infection of variola in vaccinated individuals which terminated in two or three days with the initiatory fever, but without the formation of the characteristic variolous eruption.

TABLE II.

Analysis of the Cases of Small-pox admitted at the Small-pox and Vaccination Hospital, London, from 1836 to 1851, inclusive.

PATIENTS ADMITTED WITH SMALL-POX.	Number of Patients.	FORMS OF THE DISEASE.												RESULTS.			
		Eruption regular or unmodified.						Eruption irregular or modified.									
		Confluent.	Died.	Semi-confluent.	Died.	Distinct.	Died.	Confluent.	Died.	Semi-confluent.	Died.	Distinct and varicelloid.	Died.	Discharged.	Died.	Died, affected by superadded disease.	Ratio per cent. of Mortality from Small-pox, after deducting entirely the cases affected by superadded disease.
1. Unprotected - - - - -	2654	1821	936	597	51	167	8	17	1	17	–	35	–	1658	996	81	35·55
2. After natural Small-pox - -	14	3	—	2	–	—		3	–	3	–	3	–	14	—	—	—
3. After inoculated Small-pox - -	27	10	5	2	1	—	–	4	1	4	–	7	–	20	7	1	23·07
4. After Vaccination and Small-pox - -	5	2	2	—	–	—	–	1	–	—	–	2	–	3	2	—	Too limited for averages.
5. After Vaccination, or Inoculation, and Small-pox - - - - -	1	1	—	—	–	—	–	—	–	—	–	—	–	1	—	—	
6. After Vaccination or Inoculation - -	2	2	1	—	–	—	–	—	–	—	–	—	–	1	1	—	
7. After Vaccination, with cicatrix or cicatrices - - - - -	2787	428	153	232	6	89	–	486	24	416	3	1136	5	2596	191	47	5·25
8. Stated to have been vaccinated, but have no cicatrix - - - -	290	138	67	33	1	16	1	42	5	20	–	41	–	216	74	14	21·73
9. Stated to have been vaccinated, but particulars of cicatrix not recorded -	17	4	2	2	1	3	–	1	–	—	–	7	–	14	3	2	6·66
Total - - - -	5797	2409	1166	868	60	275	9	554	31	460	3	1231	5	4523	1274	145	19·97

TABLE II. Of the 5,797 cases of small-pox, 2,654, or 45 per cent., were unprotected; 47 cases, or less than 1 per cent., were after a previous attack of small-pox, or small-pox inoculation; 3,094 cases, or 53 per cent., were after vaccination.

69 of the unprotected patients had the eruption modified as it is by vaccination, although it could not be ascertained that any of these patients had ever undergone vaccination. They were examples of mild natural small-pox, such as have no doubt occurred at all periods to a few favoured individuals, and in which, fortunately for the objects attacked, the disease leaves no trace behind. Some of the cases occurred in little children, whose mothers were at the hospital with them, and by whom it was perfectly well known that no vaccination had ever been attempted. After making allowance in the unprotected for those who died affected by superadded disease, which was about two per cent., there died 35½ per cent. of small-pox.

14 patients had small-pox after a previous attack of natural small-pox, and not one died. 27 patients had small-pox after having been some years before inoculated for small-pox, and they died at the rate of 23 per cent.

2,787 bore marks of having been previously vaccinated; and after deducting the cases affected by superadded disease, which amounted, as in the unprotected, to 2 per cent., there remained a mortality of 5¼ per cent. from small-pox.

TABLE III.

Ages of the unprotected **Patients** admitted with **Small-pox** at the Small-pox and Vaccination Hospital, London, from 1836 to 1851 inclusive, with the rate per cent. of Mortality, calculated at different periods of life.

Date. 1836—1851.	Age in Years.												Totals.
	0—5	5—10	10—15	15—20	20—25	25—30	30—40	40—50	50—60	60—70	70—80	80—90	
Patients - -	356	334	270	571	669	270	154	18	8	2	1	1	2,654
Deaths - -	181	91	62	154	274	124	89	13	5	1	1	1	996
Per-centage of Deaths -	50	27	23	26	40	45	57	69		75			37

Table III.—Natural small-pox will be seen to be a most fatal disease at all periods of life; the most so in infancy and advanced life; the least so from 10 to 15 years of age; under 5 years it is 50 per cent.; still greater, however, under two years; the mortality after the age of 20 rises suddenly, and increases gradually; at 30 it exceeds the mortality of infancy, and after 60 hardly any escape.

TABLE IV.

Analysis of the Cases of Small-pox after Vaccination, admitted at the Small-pox and Vaccination Hospital, London, from 1836 to 1851, inclusive, showing, from a careful examination of the Cicatrices, the relative amount of security given by the number of vesicles produced at Vaccination; and, judging from the character of the Cicatrices, the probable state of activity and efficacy of the Lymph used for Vaccination.

Patients admitted with Small-Pox.	Number of Patients.	Character of the Cicatrices.	Cases.	Forms of the Disease.														Results.				
				Eruption unmodified in 945 cases.							Eruption modified in 2,149 cases.											
				Confluent.	Died.	Semi-confluent.	Died.	Distinct.	Died.	Number of unmodified cases.	Confluent.	Died.	Semi-confluent.	Died.	Distinct and varicelloid.	Died.	Number of modified cases.	Discharged.	Died.	Died affected by superadded disease.	Rate per cent. of mortality from Small-pox, after deducting entirely the cases affected by superadded disease.	
1. Having one vaccine cicatrix	1357	good	768	107	34	72	2	30	-	209	131	5	133	1	295	2	559	724	44	12	4·23	7·57
		indifferent	589	168	68	57	1	26	-	251	110	11	80	-	148	1	338	508	81	12	11·95	
2. „ two vaccine cicatrices	888	good	608	66	20	44	2	12	-	122	115	4	91	-	280	1	486	581	27	11	2·68	4·13
		indifferent	280	51	21	31	1	9	-	91	43	3	40	1	106	-	189	254	26	6	7·29	
3. „ three vaccine cicatrices	274	good	187	13	5	12	-	6	-	31	22	1	34	-	100	1	156	180	7	4	1·63	1·85
		indifferent	87	7	3	7	-	5	-	19	17	-	11	-	40	-	68	84	3	1	2·32	
4. „ four or more vaccine cicatrices	268	good	202	10	2	9	-	1	-	20	38	-	22	-	122	-	182	200	2	-	0·99	0·74
		indifferent	66	6	—	—	-	—	-	6	10	-	5	1	45	-	60	65	1	1	0·00	
5. Stated to have been vaccinated, but having no cicatrix - -	290		290	138	67	33	1	16	1	187	42	5	20	-	41	-	103	216	74	14		21·73
6. Stated to have been vaccinated, but particulars of cicatrix not recorded - -	17		17	4	2	2	1	3	-	9	1	-	—	-	7	-	8	14	3	2		6·66
Total - -	3094		3094	570	222	267	8	108	1	945	529	29	436	3	1184	5	2149	2826	268	63		6·76

Note.—Small-pox has prevailed extensively in London since the date of this communication, and I have been favoured by Mr. Marson with the following particulars:—In the 5 years, 1852 to 1856 inclusive, 2,253 patients have been admitted with small-pox after vaccination into the Small-pox and Vaccination Hospital, London. Of these, 355 had each four or more vaccine cicatrices, 3 of them have died, 1 from small-pox, and 2 from superadded disease, wholly independent of small-pox; so that we may fairly say, deducting 2 cases, of 353 patients, having four or more vaccine cicatrices, 1 only has died of small-pox. This number, added to the published cases, makes 620, followed by 3 deaths, rather less than *half of one* per cent.—J.S.

Table IV.—3,094 patients with small-pox reported themselves to have been vaccinated at some period of their lives. Patients were never entered in the register as vaccinated unless the account of the vaccination

was a tolerably clear one, either from the patient's own recollection, or the account received of it from his or her friends,—their belief that it had taken effect properly, and their trusting to it as their protection against small-pox. The only exceptions to this statement were:—1st. Those who had the usual vaccine cicatrices on their arms, but knew nothing of having been vaccinated. 2d. Patients who were admitted while under vaccination; they were considered, at whatever stage the vaccination had arrived, as unprotected, and entered accordingly. Of the whole 3,094 cases after vaccination, with or without cicatrices, there died, after deducting the cases of superadded diseases, 6¾ per cent. 945 of the vaccinated cases were unmodified, and 2,149 modified. Of the 945 unmodified cases there died 231, or 24 per cent., by which it will be observed that there is a difference of one third in the mortality between these cases and the unprotected cases; therefore, although the eruption was not recorded in the register as modified or mitigated, the constitution must have received a protective influence, as regards fatality, to the amount of one third, or else there would not have been this difference in the number of deaths. Many cases were not entered as modified, though in my opinion at the time they would have been more correctly so entered; that opinion is sustained by the mortality, which would have been greater but for the disease having been influenced by vaccination.

1,357 patients had one vaccine cicatrix, and of these there died, with a good cicatrix, 4¼ per cent.; with an indifferent cicatrix just upon 12 per cent., the average being 7½.*

888 patients had two cicatrices, and there died, with good cicatrices, 2½ per cent.; with indifferent cicatrices, 7¼ per cent.; the average being a little over 4 per cent.

274 patients had three cicatrices, the mortality being with good cicatrices 1½ per cent.; with indifferent cicatrices 2¼ per cent.; average 1¾ per cent.

268 patients had four or more cicatrices, and there died with good cicatrices just under 1 per cent.; with indifferent cicatrices none, the average being only ¾ of 1 per cent. There is a difference in the last statement between the mortality of those having good and indifferent cicatrices that does not accord with the previous results; but all candid minds will readily be convinced that the average would have been preserved had the numbers been greater to have calculated from, for when all the numbers are taken together, there died with good cicatrices 3·04 per cent.; with indifferent cicatrices 9·77 per cent. Then, again, as regards the number of cicatrices, there died with one and two cicatrices 6·21 per cent.; with three, four, or more cicatrices 1·30 per cent.

The danger from small-pox arises in the great majority of instances solely from the quantity of eruption—from the extensive interruption and destruction of the functions of the skin produced by the pustules, in much the same way as from a severe burn or scald. Death may take place, and commonly does take place, without any perceptible disease of the internal organs essential to life, excepting the pustules on the air-passages and congestion of the lungs, the latter being produced by the additional duty thrown upon them, as occurs whenever the healthy functions of the skin are interrupted. Knowing this,—that the danger arises principally from the quantity of eruption,—we may examine the question in another light. By referring to Table IV., it will be seen that, of 2,245 patients with one and two vaccine cicatrices, 392, or 17½ per cent., had small-pox in a confluent unmodified form. Whilst of 542 patients with three, four, or more cicatrices, 36, or 6½ per cent. only, had the confluent unmodified disease. Again, 1,765 patients had *good* cicatrices, of whom 196, or 11 per cent., had the confluent unmodified disease; whilst of 1,022 with *indifferent* cicatrices 232, or 22 per cent., just double the per centage of the above, had it in the unmodified form. Test the question in which way soever we will, the result is in favour of producing four vesicles at least at vaccination, with lymph that leaves good permanent cicatrices.

290 patients reported themselves vaccinated, but had no cicatrices, and they died at the rate of 21¾ per cent., which teaches us the important fact, that the mortality from small-pox is more than four times as great in persons who, though believing themselves protected by vaccination, are without cicatrices, as it is in those who bear vaccine cicatrices. Practically, this is a point of very great importance, and persons so circumstanced as to have no cicatrix should be re-vaccinated, if young, upon attaining puberty, or at any subsequent period, without delay. 17 patients were entered as vaccinated, but the particulars of the cicatrices have been omitted in the register. These cases occurred in 1836–7–8. The collected number ought to have been rather larger. In making the tables the cases were arranged yearly from 1851 to 1836, and one or two patients some years were found to have had the particulars about the cicatrix omitted. The numbers being unimportant, they were incorporated, for the sake of simplicity, with the list of cases without cicatrices; but when so many as 17 were found in three years, it was thought to be better to give them a separate heading. The total number of cases, however. so added to the list without cicatrices, did not exceed 20, and, so far as it goes, makes the per centage of deaths of the class without cicatrices rather less than it ought to have been.

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* A good vaccine cicatrix may be described as, distinct, foveated, dotted or indented, in some instances radiated, and having a well, or tolerably well, defined edge.

An indifferent cicatrix, as, indistinct, smooth, without indention, and with an irregular and ill-defined edge.

TABLE V.

Ages of the Patients admitted with Small-pox after Vaccination, at the Small-pox and Vaccination Hospital, London, from 1836 to 1851 inclusive; and where they were vaccinated, so far as could be ascertained.

Where Vaccinated.	Number of Patients.	Ages of the Patients.																				Results.			
		0-5		5-10		10-15		15-20		20-25		25-30		30-35		35-40		40-50		50-60					
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Discharged.	Died.	Died affected by superadded disease.	Rate per cent. of mortality from small-pox, after deducting entirely the cases affected by superadded disease.
Vaccinated at the stations of the National Vaccine Establishment, or at the Small-pox and Vaccination Hospital, or at the stations of the Royal Jennerian Society in London -	155	2	–	12	3	33	4	68	4	24	–	11	1	3	1	2	–	–	–	–	–	142	13	4	5·96
Vaccinated in the Metropolis, but not at the Public Vaccine Institutions, so far as could be ascertained - - -	370	5	2	29	3	76	1	135	7	77	5	26	3	13	1	3	–	6	1	–	–	347	23	5	4·93
Vaccinated in the Provinces of England and Wales - -	1,987	–	–	8	1	62	3	528	29	753	72	363	34	153	17	74	18	44	7	2	1	1,805	182	42	7·19
Vaccinated in Scotland - -	79	–	–	–	–	–	–	16	1	36	2	15	2	7	–	4	–	1	–	–	–	74	5	2	3·89
„ in Ireland - -	35	–	–	–	–	8	–	8	2	13	–	2	–	2	–	2	–	–	–	–	–	33	2	–	5·71
„ in Foreign Countries	279	–	–	2	–	6	1	47	1	103	6	80	13	19	1	16	2	6	1	–	–	254	25	6	6·95
Not known where Vaccinated -	189	–	–	5	–	21	1	64	5	52	8	29	2	13	1	1	–	4	1	–	–	171	18	4	7·56
Totals - -	3,094	7	2	56	7	206	10	866	49	1,058	93	526	55	210	21	102	20	61	10	2	1	2,826	268	63	6·76

Table V.—But few patients under 10 years of age have been received with small-pox after vaccination. After 10 years the numbers begin to increase considerably, and the largest admitted are for the decennial period from the age of 15 to 25; and, although progressively diminishing, they continue rather large up 30; and from 30 to 35 they are nearly the same as from 10 to 15; but as in the unprotected, at this period of life, the mortality is doubled, showing the cause to be, probably, as much or more depending on age and its concomitants, as on other circumstances. In still further advanced life, the rate of mortality will be seen to increase also, as in the unprotected state; but this tendency may be in a considerable degree counteracted there is but little doubt, by giving more attention than has hitherto generally been given to the perfection of the process of vaccination.

155 patients are reported to have had small-pox after having been vaccinated at the public vaccine institutions of London.

370 had been vaccinated in the metropolis, but not at the public vaccine institutions, so far as could be ascertained.

1987 patients were stated to have been vaccinated in the provinces of England and Wales.

79 in Scotland.

35 in Ireland. Only two a year. This is a very remarkable circumstance, when we bear in mind the large mass of Irish population resident in this metropolis, besides those here for a short time every year.

279 had been vaccinated in foreign countries; this number also includes a few, but very few, vaccinated in the British colonies.

189 did not know where they had been vaccinated. They were English, and principally country people.

The question, then, as regards the place where the vaccinations were performed, of the patients subsequently admitted with small-pox at the hospital, stands, collectively, per cent. thus:—

Vaccinated at the Public Vaccine Institutions of London - - - -	5	per cent.
„ in the Metropolis, but not at the Vaccine Institutions, so far as could be ascertained - - - - - - -	11	„
„ in the Provinces of England and Wales - - -	64	„
„ in Scotland - - - - - - -	2	„
„ in Ireland - - - - - - - -	1	„
„ in Foreign countries - - - - -	9	„
Not known where vaccinated - - - - - - -	6	„
	98	„

The remaining 2 per cent. are made up of fractions of the above.

TABLE VI.

AGES of the PATIENTS at the time they were VACCINATED, who were subsequently admitted with SMALL-POX, at the Small-pox and Vaccination Hospital, London, from 1836 to 1851, inclusive.

DATE OF ADMISSION WITH SMALL POX. 1836—1851.	AGES IN YEARS WHEN VACCINATED.										TOTAL.
	0—5	5—10	10—15	15—20	20—25	25—30	30—40	40—50	50—60	Ages when Vaccinated not stated.	
Patients - - -	2,794	101	64	17	6	—	—	—	1	111	3,094

TABLE VI.—Of the 3094 patients admitted with small-pox after vaccination, 2794, or 90 per cent., had been vaccinated when under five years of age.

My opportunities of examining, with regard to previous vaccination, the foreigners admitted with small-pox at the hospital, and comparing them with each other, and with the same class of persons in this country, have led me to the conclusion that vaccination is performed in the best manner, generally, by the Danes, Swedes and Norwegians, and Germans, judging them by the standard shown in Table IV. to afford the most effectual security: then come the Italians, and, from the few I have seen, the Spaniards; then the Scotch; then the Irish; and lastly, the English and French. The French who have been admitted as patients at the Small-pox Hospital appear to have been very indifferently vaccinated; they have been but few, it is true, and these few may have been of the few badly vaccinated in France.

It will be observed, that two thirds of the whole number admitted with small-pox after vaccination had been vaccinated in the provinces of England and Wales. By "provinces," meaning the whole of England and Wales, except London. and the area included in the metropolitan district. I am most anxious to draw the attention of my professional brethren in the country to the above fact; and amongst that enlightened community, the feeling can scarcely fail to be otherwise than general, that there must exist some grave and lamentable evils (more especially affecting the humbler classes) connected with the circumstances under which vaccinations in country districts are performed. The details recorded in this paper may be urged as calling upon those of our provincial brethren whose position and ability give them influence, to lend their aid in tracing the evil to its root, and using their endeavours to remove a stigma which, whatever may be its origin, is too likely to be shared by themselves with less skilful, less conscientious, and less scrupulous men. Some reasons may, perhaps, be assigned for a large number of persons in country districts being imperfectly vaccinated, but there can be no justifiable reason why the rural inhabitants of England and Wales should be far less well vaccinated than are the rural inhabitants of Denmark, Sweden, and Prussia. That they are so, I know to be a fact, from the opportunities presented to me of observing large numbers of Germans more especially, who, from the efficient way in which they had been vaccinated, have had small-pox usually in the light varicelloid form. The subject is a delicate one to allude to—to point out defects is always painful; but the vital importance of the subject, as affecting the health and lives of thousands, will be my excuse for the remarks now made, and for further calling attention to Table V., and the collected percentages at page 21. When so many of the lives of our patients are at stake, to say nothing of minor, though still grave evils, that may be prevented by greater care and better management,—it becomes a positive duty to express our opinions as strongly as may be consistent under the circumstances; to make at least an appeal to the profession, which will no doubt be promptly responded to by a more careful performance of an operation which, though of minor importance in itself as a surgical operation, is of most serious importance in its consequences, as affecting health and life. If the great discovery of Dr. Jenner can avert, as I have shown it can when effectually carried out, the serious results of this terrible disease, it is surely desirable to be aware of any facts which might point out the means and the necessity of performing the operation in a more complete manner. With good lymph and the observance of all proper precautions, an expert vaccinator should not fail of success in his attempts to vaccinate above once in 150 times; yet a large number of those who take upon themselves the duty, think they do well if they succeed, however imperfectly, five times out of six. Patients often present themselves with small-pox at the hospital, who state they have been cut five, six, eight times, or more, for cow-pox without effect. This is a great evil. It would happen but rarely in careful hands. Such persons think it is of no use having the operation tried again, that it will not take effect if they do, and ultimately they are attacked by small-pox, and perhaps die: whereas, had they fallen into the hands of a good vaccinator, their lives would most likely have been saved. Instances of the above kind are of frequent occurrence at the Small-pox Hospital.

In December, 1836, a woman, æt. 54, and her son, æt. 15 years, were admitted with small-pox, and died in the course of five days; their daughter, a young woman, died of small-pox at their house in Hull Street, City Road, the day before the mother died at the hospital. All these poor people had been vaccinated three years previously, at a parish vaccination, at a village church in Suffolk, and bore marks of the vaccination.

Now, knowing what we do of the protective powers of vaccination, it is almost impossible to suppose otherwise than that these poor people had been vaccinated with improper lymph. They, however, believed they had been efficiently vaccinated, and trusted to it for their security against small-pox. These three lives fell a sacrifice, most likely, to mere carelessness.

The mortality alone, severe as it is, between the indifferently vaccinated and the well vaccinated patients, is not the only evil result to be regretted of bad vaccination. Proportionate to the mortality has been the severity of the disease in those who escaped death; damaged health, and disfigurement for life, is frequently the lot of those who have small-pox after having been vaccinated imperfectly in but one place; thus bringing on vaccination discredit, which is in no way due to it intrinsically, but is owing solely, with but very few exceptions indeed, to the want of proper knowledge of the subject, and of the necessary care with which the operation has been conducted.

Great judgment and caution should be used in the selection of vaccine lymph; in this lies one of the principal causes of failure in vaccinating, and subsequent insecurity of the individual, even when the vaccination does take effect. This advice is offered after seventeen years of constant practice of vaccination, and after the experience acquired by vaccinating between forty and fifty thousand persons. Lymph for use is in its best state on the seventh day of the progress of the vesicle it is taken from—the day week from the vaccination. It should be taken when the vesicles are plump, and just before the formation of the areola. Under no circumstances should it be taken for use later than twenty-four hours after the areola has begun to form. If this rule were invariably observed, there would be, as I believe, but very few cases of severe small-pox after vaccination. At this stage of the progress of the vesicle the lymph is in the state most certain of taking proper effect, and of leaving the best cicatrices, indicative of its efficacy, a result shown in the accompanying tables to be of the greatest importance to individual security, in case of small-pox occurring in after life. A serious error in vaccinating is the use of blunt lancets—lancets unsuitable for other purposes. It is impossible to have a lancet too sharp for vaccinating; the sharper the lancet, the more perfect the success of the operation, even in good hands.

Mode of conveying lymph.—A convenient way, in practice, of conveying lymph about for use, is in stoppered bottles, the stopper on which the lymph is placed, and kept fluid, being ground flat, and projecting into the bottle. The lymph ought not, however, to be kept in this way above twenty-four hours in warm weather, or forty-eight in cold. Like all other moist animal matter, it soon begins to undergo chemical changes, which render it unfit for use. When it has become putrid, or even putrescent, it will produce the fatal results which are well known to follow inoculation with decaying animal matter. Much the same remarks apply, *mutatis mutandis*, to the lymph preserved in capillary tubes, as to that preserved in bottles.

Mode of vaccinating.—The arm to be operated on should be firmly grasped by the left hand of the operator, so as to make the skin tense, then, the lancet being already charged, with the right hand the lymph should be introduced by a puncture of a valvular shape, from above downwards, so managed that the lymph at each puncture may gravitate into the wound. In this way the lymph may be introduced in five punctures,—the number I recommend,—from half to three fourths of an inch apart, without recharging the lancet; the skin being kept tight all the while, until the lymph has been introduced, care being taken that the punctures are not bruised, as too frequently happens by undue use of the lancet. It then matters not how much the wounds may bleed, as the bleeding will not interfere with the success of the operation.

Mode of preserving lymph.—By far the best way of preserving vaccine lymph, and also of transmitting it to a distance, is on ivory points. They should be *well* charged, not simply touched; the quantity allowed to dry should be about equal in its wet state to half a drop: when the charged points are required for use, they should be lightly dipped in water, and placed for a few minutes on the edge of a book, so that the lymph may have time to become soft, much as it was when taken from the vesicle. Then, after making a puncture with a lancet, the ivory point may be inserted into the arm, and kept there with the thumb for a short time; or the moistened lymph may be scraped off the point, and at once inserted with the lancet. Several little niceties are required in vaccinating with preserved lymph, which are not generally so much attended to as they deserve to be, in order to ensure perfect success.

Re-vaccination.—For many years past I have practised re-vaccination extensively on persons applying for the purpose at the vaccination room; on the servants and nurses of the hospital, on persons coming to visit their friends patients in the hospital, and, lately, on the numerous workmen employed in building the new hospital. The effect produced by re-vaccination sixteen or seventeen years ago was, with some few exceptions, nothing more than a little irritation, or at most an abortive vesicle with irregular areola. But, during the last three or four years, I have seen a great many persons, on whose arms the vesicles produced by re-vaccination have been quite, or nearly perfect, even on those who bore good cicatrices from the first vaccination. I have always recommended re-vaccination after puberty, principally for this reason, it gives those who have been indifferently vaccinated in infancy another chance of being protected. Probably it does not afford the same amount of protection that the first vaccination, well performed, does. The great object to aim at is to vaccinate *well* in infancy, this should be looked upon as the sheet anchor; and, therefore, a careless vaccination should be deprecated at all times, practised under the belief that if it fails to take effect properly, it will be of no consequence, as the operation can be repeated. By such proceeding the vaccination often takes effect badly, and will never afterwards take effect properly, and yet the individual may take small-pox severely. This should be viewed as, unfortunately, one of the imperfections in the practice of vaccination, but the knowledge of it teaches us the paramount importance of paying the strictest attention to the mode of performing the *first* vaccination.

In 1838 small-pox attacked the children in the Deaf and Dumb Asylum, and one or two a week, for three or four weeks, sickened with it, when Dr. Babington,* physician to the Asylum, requested me to re-vaccinate the whole of the inmates, about 260. I did so. Four days afterwards another child was attacked, who had received the infection of small-pox before he was re-vaccinated, but from this date the disease was arrested in the establishment. Some months subsequently, a servant, who had come fresh into the asylum, had small-pox, but the disease on this occasion did not spread to the other inmates.

For upwards of seventeen years of my connection with the Small-pox Hospital, not one of the servants or nurses of the hospital has been attacked by small-pox, although vaccination has been the only protection of many of them; but I have always re-vaccinated them on their first coming to live at the hospital.

On rebuilding the hospital lately, a large number of workmen were employed for several months after the arrival of the patients, most of these workmen consented to be re-vaccinated, two only were attacked by small-pox, but *they* were amongst the few who were *not re-vaccinated.*

The inferences deducible from the foregoing facts and statements are:—

1. That natural small-pox destroys about one third of all whom it attacks.

2. That small-pox after small-pox is of comparatively rare occurrence in a population who owe their protection in large numbers to having gone through the natural or inoculated disease. That a second attack of natural small-pox, as well as being rare, is probably not often fatal, and that protection seems to be the law. That after inoculated small-pox, an attack of small-pox has more frequently led to fatal results, but there is reason to presume that the virus used for inoculation, like a very great deal of the lymph used at the present day for vaccination, was often taken at too advanced a stage of the disease, and thus did not afford the full measure of protection it was capable of affording if taken at a proper time. That when the disease does occur it is sometimes modified, as it is after vaccination, and that the modification presents the same characters. That second attacks of small-pox are further presumed to be of very rare occurrence, as there is no instance recorded of a person admitted with small-pox a second time at the Small-pox Hospital, although the hospital has now been founded 107 years. That, as upwards of 20 different diseases are known by the author to have been mistaken for small-pox during the last sixteen years, and sent as such to the Small-pox Hospital, it may be fairly assumed that many of the cases reported amongst the public, during the last quarter of a century, as second attacks of small-pox, have been, either in the primary or secondary instance, no small-pox at all. That small-pox does, however, occur a second time there can be no reasonable doubt, and one of the circumstances that seems to predispose the constitution to receive a second attack of the disease is, as after vaccination, exposure for a time to great change of climate, either hot or cold.

3. That vaccination performed in infancy affords almost complete protection against the fatality of small-pox to the period of puberty. That a variety of circumstances conspire to make it almost impossible to ascertain exactly in what proportion to the vaccinated, cases of small-pox do subsequently occur, or might occur, if all persons lived to an advanced age; in illustration of which it may be stated that a woman 83 years of age was admitted at the hospital in 1844, with severe confluent natural small-pox, of which she died, who had nursed her own children and her grand-children with the disease, and had otherwise been exposed often to variolous infection, but never took it before. That of the small proportion to the great mass protected by vaccination, who do unfortunately take small-pox in after life, of those who have been vaccinated indifferently in but one place, about 12 per cent. die; but that of those who have been well vaccinated in four places or more, the proportion of deaths is less than 1 per cent.; so that by careful management the protection to life may be rendered all but perfect.

4. That, as a matter of safety, it is well for all persons who were vaccinated in infancy to be re-vaccinated at puberty, this measure being more especially requisite for those who were either indifferently or doubtfully vaccinated in infancy, and still more especially necessary for those who, though vaccinated, have no cicatrix remaining. Finally, as a matter of precaution, it is desirable that all persons should be re-vaccinated on small-pox existing in the house where they are residing; a precaution, however, that will cease to be necessary to advise when all persons have the benefit of proper and efficient vaccination.

A circumstance has come to my knowledge in prosecuting this inquiry, which, in conclusion, I beg to submit to the Society; and, although its bearing is not so rigidly precise as the rest of this communication, the point it conveys is of an important character, substantially true, I believe, and proper to be brought forward on this occasion, as showing, on a large scale, the protective powers of vaccination. Already it has been stated that, in sixteen years 155 patients, with and without vaccine cicatrices, or about 9 a year, have been admitted with small-pox at the Small-pox Hospital, who were reported to have been vaccinated at the public vaccine institutions of London. In an Appendix to the Report from the Select Committee of the House of Commons on the Vaccine Board, in 1833,* there are some official returns for the previous five years of the numbers vaccinated annually at the different stations of the National Vaccine Establishment, at the Small-pox and Vaccination Hospital, and at the stations of the Royal Jennerian Society in London, which, together, will be found to amount to 102,114; this, divided by 5, gives an average of 20,422 as vaccinated yearly. About the same numbers had been vaccinated at these institutions for several years before the returns were made, were continued, somewhat increased, for several years later, until after the time of passing the Vaccination Act in 1840, and, with perhaps some slight diminution of late years, have been continued ever since. These persons so vaccinated were for the most part poor persons, and also for the most part stationary, living too in a town where small-pox is never absent, and, in case of being attacked by it, likely to apply for admission at the Small-pox Hospital, the only place in London for the reception of small-pox patients; yet the numbers admitted with small-pox, who had been vaccinated at these public vaccine institutions, have amounted but to a fraction over 9 a year, or 1 to 2108 vaccinated; and the deaths from small-pox but to 1 in 36,305 vaccinated.

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* For an account of two similar occurrences and results, see a paper entitled, Cases of Small-pox which occurred in the Asylum for the Deaf and Dumb, with an account of the Re-vaccination of all the Children in that establishment, by Dr. Babington, "Guy's Hospital Reports," vol. i. p. 159.

This may be truly designated one of the triumphs of medical science; a result more favourable and gratifying could hardly have found a place in the most sanguine and philanthropic hopes of the humane and illustrious Jenner.

G.

MR. MARSON'S PETITION to the HOUSE OF COMMONS on the VACCINATION BILL, 1856.

To the Honourable the Commons of the United Kingdom of Great Britain and Ireland, in Parliament assembled.

THE Petition of James Furness Marson respectfully showeth that:—

Your Petitioner is a duly qualified medical man, and has been for upwards of twenty years the resident surgeon of the Small-pox and Vaccination Hospital, London.

Your Petitioner has attended, in the time above mentioned, and has kept accurate notes of, nearly 9,000 cases of small-pox.

Your Petitioner has also, in the same period, vaccinated upwards of 40,000 persons, and he is desirous of stating that he has never seen any evil results traceable to vaccination, with the exception of a single instance, in which measles occurred at the same time, and four or five examples of rather severely sore arms, arising from lymph recently taken from the cow. He has never seen other diseases communicated with the vaccine disease, nor does he believe in the popular reports that they ever are so communicated. If such results were really true, as stated, and formed part of judiciously conducted vaccination, they must have come under the observation of your Petitioner in vaccinating upwards of 40,000 persons. Vaccination is performed generally at an early age; parents are unwilling to believe that there is anything constitutionally wrong in their offspring; and, when other diseases follow, vaccination gets blamed for what is really and truly due to other causes, as may be seen in those who have never been subjected to vaccination.

Your Petitioner has had, and has still, great cause to regret the suffering, disfigurement, and mortality produced by small-pox, nearly the whole of which might be, in his opinion, prevented by carefully conducted vaccination.

The mortality from small-pox in the unvaccinated, of cases taken generally, is 35 per cent.; but of children under 5 years of age it is 50 per cent. And of those who recover, a great many suffer permanent disfigurement; some loss of sight, and others have their general health greatly damaged.

The mortality, on the contrary, among the vaccinated, attacked by small-pox, is 7 per cent., taken generally. But among what be characterised as the badly-vaccinated it is 15 per cent. Among those, on the other hand, who may be considered to have been well vaccinated,—that is to say, who have four or more good vaccine cicatrices,—the mortality is less than 1 per cent. Thus, the necessity of carefully conducted vaccination is rendered strikingly manifest by the mortality of 15 per cent. in the badly vaccinated, and only ¾ of 1 per cent. in the well vaccinated, when attacked by small-pox. In the badly vaccinated who recover from small-pox there is a large amount of suffering and permanent disfigurement that might be prevented, and which should be looked upon as a very serious evil, more especially to the female sex.

Among children under 14 years of age who have been vaccinated, small-pox hardly ever proves fatal.

It should, however, be remembered that no authorized system of vaccination has been established in England. All persons—medical men, clergymen, amateurs, druggists, old women, midwives, &c.—are allowed to vaccinate in any way he or she may think proper, and the persons operated on are considered to have been vaccinated. The consequence of this carelessness and want of arrangement is, that there has been, and is, a great deal of very inefficient, almost useless, vaccination performed in England.

These facts have been ascertained by your Petitioner from a minute examination and classification of the cases of small-pox that have come under his notice at the Small-pox and Vaccination Hospital, London; which cases were individually carefully recorded in the Hospital register at the time of their occurrence, and the general results of which he has embodied and communicated to the profession in the XXXVIth Volume of the Transactions of the Royal Medical and Chirurgical Society of London.

As an example of what can be done by efficient vaccination, your Petitioner begs to state, that not one of the nurses or servants of the Small-pox Hospital has had small-pox for the last twenty-years. They have all been either vaccinated or re-vaccinated, on coming to live at the Hospital.

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[*] Report from the Select Committee on the Vaccine Board, with the Minutes of Evidence, and an Appendix, ordered by the House of Commons to be printed, 28th August 1833, Appendix A,B,C, pp. 137, 141, 149.

Nearly all the junior members of the educated classes in this country have, for many years past, been vaccinated, almost without exception. What the educated classes have adopted by choice, after mature deliberation, can hardly, by the most perverted reasoning, be considered improper for the lowest and uneducated classes to conform to; it is, in fact, what the latter themselves would most likely also adopt, by choice, if they were educated, and a little higher in the scale of society.

As the law now stands, it can hardly be considered just, individually, to the lower classes themselves. They are not obliged to be vaccinated, but they are not allowed to be inoculated, lest they should propagate small-pox, as they undoubtedly would by inoculation; so that if they do not choose to adopt vaccination they are left to take small-pox in the natural way; this they almost certainly do take, sooner or later, and small-pox in the unvaccinated is one of the most fatal diseases in this country, destroying, as was before stated, 35 per cent. of those attacked by it.

Your Petitioner having had frequent opportunities of judging from the vaccine cicatrices on the arms of seamen from Denmark and Sweden, who have become patients of the Small-pox Hospital, of the efficient way in which they had been vaccinated, and who, having taken small-pox, have had it, almost invariably, in the lightest form. This, your Petitioner believes, was entirely due to their having been so efficiently vaccinated, and, therefore, he ventures to recommend that similar arrangements to those now in force in Denmark and Sweden for conducting vaccination should be adopted in England.

The many foreigners admitted, in a series of years, as patients at the Small-pox Hospital, have enabled your Petitioner to observe that vaccination is, as a rule, much better performed abroad than in England, that, in fact, it is far less satisfactorily performed in England than in any other country in Europe, owing, most likely, to a total absence of organization of the subject in this country.

Your Petitioner, therefore, fully convinced himself, from ample opportunities of judging for a period of 20 years, of the great good conferred on mankind by vaccination, when judiciously and carefully carried out, and knowing also, from ample experience in vaccination, of no objections to it, except unfounded prejudice, earnestly entreats your Honourable House to pass the Vaccination Bill before Parliament, in the full conviction that it will be, if provision be made for its due administration, a most beneficial act of the Legislature, for those who, from their carelessness, prejudices, and ignorance, or from their early age, are unable on this subject to take proper care of themselves.

And your Petitioner, as in duty bound, will ever pray.

(Signed) J. F. MARSON,
Member of the Royal College of Surgeons of England,
and Licentiate of the Society of Apothecaries, London.

May 26, 1856.

H.

ON the present DEATH RATES of LONDON, at different Ages and from different Diseases, as compared with the corresponding Death Rates at the End of the 17th and in the Middle of the 18th Century, by Dr. GREENHOW, Lecturer on Public Health at St. Thomas's Hospital, Physician to the Western General Dispensary.

I BELIEVE there is no good reason for supposing that vaccinated persons, because they are less susceptible of small-pox, are therefore more liable to be attacked by other diseases, either of an infective or constitutional character. It has, indeed, been asserted, that the comparative immunity from small-pox produced by vaccination has been counterbalanced by a greater prevalence and fatality of other diseases, and particularly of fever, phthisis, and strumous affections. This assertion is, however, totally without the support of facts; for, both the mortality from all causes, and the mortality occasioned by each of these diseases, have largely diminished since the period when the prevalence of small-pox was unchecked by preventive measures. This opinion of mine is founded upon a careful examination of the London bills of mortality, and a comparison of the average death-rates from all causes, and from each of these specified causes calculated over three periods of ten years each, viz., from December 14, 1680, to December 16, 1690,* previous to the introduction of inoculation, from December 1745 to December 1755,† and again for the ten years from 1846 to 1855 inclusive, during which vaccination has been in general use.

The facts are shown in the accompanying table, in reference to which, however, it is necessary to explain that, whilst it is as nearly as possible correct in respect of the general mortality of the third period, the present death-rates from fever, diseases of the chest, and strumous affections, are somewhat over-rated in comparison with the same classes of disease in the earlier periods. On the other hand, both the general and particular death-rates of the ten selected years of the 17th and 18th centuries are under-estimated, from the circumstance that the bills of mortality took cognizance only of interments in parochial burial grounds within the limits of the metropolis; no account being taken of the deaths of persons buried in parish cemeteries adjacent to London, or in the extra-parochial burial grounds of St. Paul's Cathedral, Westminster Abbey, the Temple, the Rolls, Lincoln's Inn, St. Peter's in the Tower, the Charter House, or the Hospitals. For the same reason the deaths of many dissenters, Jews, and Roman Catholics, who were buried in sectarian places of sepulture, must have been omitted from the returns.

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* This period was chosen because it corresponds with King's calculation of the population of London, and because small-pox (the mortality from which increased after the introduction of inoculation) was uninfluenced in its course by any artificial interference.

† The Companion to the Almanack for 1828 contains a computation of the London population for 1750, which has been used for the present purpose.

The population of London in 1685 was estimated by King at 530,000,—an estimate which is considered to have been a very near approximation to the truth. The deaths at that period, and for long afterwards, considerably exceeded the births; or, to speak more properly, the baptisms fell short of the burials by about one third.* The population of the metropolis is, therefore, supposed to have been very stationary for a long period; the immigration into it from rural districts and provincial towns having done little more than compensate for the loss sustained by the excess of deaths over births. The correctness of this opinion is in a great measure confirmed by the fact that the population of London within the old bills of mortality amounted in 1801 to only 742,625 persons, showing an increase of little more than 40 per cent. during the 116 years that had elapsed since the date of King's computation, although there is no doubt that the population had latterly increased directly, as well as by its growth from external sources.

By some authorities the death-rate of London far onwards in the 18th century is said to have been as high as 500 per annum out of every 10,000 inhabitants. Assuming the correctness of King's estimate of the population in 1685, the average annual death-rate of London within the bills of mortality for the ten years 1681 to 1690 inclusive (calculated upon the number of funerals recorded in the weekly bills) appears to have been 421 in the 10,000. For the reason already assigned, this estimate is probably a good deal under the truth. Its inaccuracy is augmented by the fact that a considerable infusion of healthy persons, at the least fatal period of life, annually poured into the metropolis in pursuit of the more lucrative occupation therein procurable. These sources of inaccuracy, however, since they tend to lessen the death-rates of that period, do but lend additional force to the fact that the present death-rate is only 250 in the 10,000; or, if corrected so as to include only the district comprised within the old bills of mortality, about 260 in the 10,000; showing a decrease in the general death-rate of, at the least, 160 persons out of every 10,000 annually since the close of the 17th century. In other words, if the mortality within the limits of the metropolis, as defined in the baptismal and mortuary returns of the 17th century, were now equal to its mortality 165 years ago, London would be sustaining an annual loss by death of more than 25,000 persons over and above the number of those who, in our time, compose its list of dead. Or, if the present mortality within the limits of the Registrar General's weekly returns were equal to that of the metropolis of the 17th century, the gross annual loss would be raised by the addition of upwards of 40,000 deaths. The deaths would thus again exceed the births; and, as in the 17th and 18th centuries, the population of London could only be maintained by the immigration of persons from rural districts. The public health of London, as indicated by the rate of mortality, has therefore improved in the proportion of 26 to 42 since the close of the 17th century.

The general death-rate of the middle period selected for this comparison (1746–55), 355 in the 10,000, occupies just that intermediate place in point of numbers between those of 1685 and 1851, which it does in regard to time. It may, therefore, be fairly assumed, that the improved state of the public health has been a gradual process, keeping pace with the general progressive improvement in the habits and circumstances of the people.

The improvement in regard to the special diseases asserted to have taken the place of small-pox is, with the exception of pulmonary affections, still more remarkable; and even the latter, although more dependent on climate than most diseases, have become less fatal during the last century and a half. The annual average mortality from the causes classed in the old bills of mortality, as "consumption and tissick," "pleurisy," and "cold and cough," which together correspond with "phthisis" and diseases of the organs of respiration in the present weekly bills, during the ten years extending from 1681 to 1690, was 69·3 in the 10,000. This is, however, an inadequate estimate, since upwards of 1000 deaths annually were attributed to old age, many of which would in our day have been unquestionably referred to affections of the chest; for, while comparatively few persons die of natural decay, a large number of aged persons perish from attacks of pneumonia or bronchitis. The increased death-rate from diseases of the chest in the second period is, perhaps, partly owing to the reference of many deaths which had been classed as fever at the former period, to their proper place in this division. Epidemics of pulmonary disease appear also to have existed in two out of the ten selected years, for the mortality from this cause was largely in excess both in 1746 and 1749. Alvine flux, a disease closely resembling if not identical with the cholera of the present century, was exceedingly fatal in the concluding years of the 17th century. The average mortality it produced between 1680 and 1690 was about 2500 annually; and, no doubt, many of its victims were previously suffering from chronic affections, among which diseases of the chest would form a large section. The mortality from flux rapidly and progressively decreased in the 18th century, so that the annual average mortality occasioned by it fell from upwards of 1000 in the first ten years of the century to only 110 for the ten years, 1746 to 1755. The immediate consequence of this improvement in the public health would be the reference of an increased number of deaths to the various chronic affections which had previously furnished victims to the flux, among which, as I have already said, pulmonary affections would occupy a prominent place.

During the ten years of the present century that have been selected for the purpose of this comparison, the deaths from diseases of the organs of respiration and from phthisis (which, to obviate all doubts as to diagnosis, are thrown into a single class) have annually been at the rate of 68·2 in the myriad. It is, however, probable that a large proportion of the deaths which are now referred to pneumonia, and perhaps even some of the more rapid cases of phthisis, would have formerly been attributed to fever, on account of the pungent heat of skin by which these diseases are characterised. If, therefore, the deaths from pneumonia, which are included in the foregoing calculation of the present death-rate from pulmonary affections, be taken from the class of diseases of the chest and transferred to that of fevers, the annual death-rate from diseases of the organs of respiration (exclusive of pneumonia and including phthisis) is reduced from 68·2 to 52·8 in the myriad. Moreover, in thus comparing the death-rates of the 17th, 18th, and 19th centuries from diseases of the chest, due allowance should be made for the already recited fact, that these affections are very much influenced, both in their prevalence and fatality, by climate and seasonal conditions, which, however much they may vary between particular years, are tolerably constant when the comparison is extended over considerable periods. On this account we ought not to expect the same reduction in the mortality from this cause as from the others presently to be noticed. Furthermore, the larger amount of mechanical impurities inhaled with the atmosphere, the nature of several manufacturing operations, and perhaps, also, the more sedentary habits of many classes of workmen in the present day, all undoubtedly tend to maintain the prevalence and add to the fatality of pulmonary diseases. Whatever doubt, therefore, may be entertained as to the amount of diminution in the mortality from pulmonary complaints, it is at least very evident that no increase has been consequent upon the lessened prevalence of small-pox.

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* The old bills of mortality referred only to funerals and baptisms performed at parish churches. There was no proper registration of births and deaths until the passing of the present Registration Act. The christenings were in excess of the burials thrice only during the 18th century; namely, in 1790, 1797, and 1799

The diseases classed in the bills of mortality as "fever" and "spotted fever" were fatal, on an average, to 63·3 persons out of every 10,000 of the inhabitants of London, in each of the ten years between 1681 and 1690. Sixty years later the average annual death-rate from fever, calculated over the ten years from 1746 to 1755, had fallen to 53·9. In the present day, it is frequently difficult to distinguish between primary cephalic affections and fever accompanied by cephalic symptoms. It is more than probable that many deaths now correctly referred to disease of the head, as well as certain chest affections, accompanied, as they often are, by an intense and pungent heat of skin, would be accounted as fever by the unskilled persons who formerly assigned the cause of death. Moreover, no mention is made of scarlet fever, which, although it might occasionally be returned with measles, must likewise have aided to swell the gross annual mortality from fever. To obviate these sources of fallacy the six diseases,—scarlet fever, remitting fever, infantile fever, typhus, cephalitis, and pneumonia,—have been thrown together to form the class of fever, for the purpose of comparing the present mortality from this cause with that of the ten years of the 17th and 18th centuries. The present death-rate of the class of fever thus formed is only 38·5 in the 10,000, showing a diminution of 24·8 since 1685, and of 15·4 during the last hundred years; thus unequivocally proving that fever has not usurped the place vacated by small-pox.

The diminution in the death-rate from strumous affections is even larger than that of fever. Excluding the deaths classed under the term "chrysoms and infants," many of which were probably of strumous origin, and which amounted to between two and three hundred annually, upwards of eighty persons in the myriad died in each year, between 1681 and 1690, from the class of strumous diseases formed of the deaths registered under the heads of "convulsions," "rickets," "water in the head," and "evil." Between 1746 and 1755, the annual death-rate of these same diseases had risen to 109·9 per myriad; an increase, perhaps, like that in the class of pulmonary affections, partially caused by the greatly decreased death-rate from alvine flux; but probably still more largely occasioned by the diminution in the number of deaths recorded from "chrysoms and infants," and their reference to the head of "convulsions," which increased almost in exact proportion as the other lessened. The analogous diseases, scrofula, hydrocephalus, and convulsions, with the addition of tabes mesenterica, a form of strumous affection which, not being separately mentioned in the older bills, is not comprised in the calculation for the two earlier periods,[*] are in our time conjointly fatal to less than twenty-one out of every myriad of the living population. In other words, scrofulous disease, considered apart from consumption, is nearly three fourths less fatal, now that the deaths from small-pox form but a small part of the gross mortality, than it was anterior to the adoption of inoculation. To revert once more to pulmonary diseases, may not this very large diminution in the number of deaths from the strumous affections of early life be one indirect cause of the maintenance of a large mortality from tubercular phthisis, persons who would formerly have fallen victims to hydrocephalus, convulsions, or rickets, being preserved at the present day until the development of their constitutional malady in the form usually assumed at a later period of life?

Notwithstanding the uncertainties of nomenclature, and the apparent fluctuations between the first and second series of years, it is quite certain that both the general mortality and that from special diseases has very largely declined since the end of the 17th and middle of the 18th centuries; and that there is not the slightest foundation for the assertion that any kind of disease has increased *pari passu* with the decrease of small-pox, or the employment of vaccination.

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[*] There can be little doubt that tabes mesenterica existed in the former periods, but that it was referred to some other head, perhaps, accompanied as it is by two such prominent symptoms as large belly and diarrhœa, partly to tympany and partly to flux. There is perhaps as little doubt that the same constitutional tendency which at one time becomes developed into a certain form of disease may under a change of circumstances assume a different form. It is thus that I would account for the entire disappearance of rickets from the causes of death, the place they formerly occupied being perhaps, in our time, partly assumed by mesenteric disease. That some such substitution of one form of disease for another really occurs I do not hesitate to believe; but it is rather a conversion of analogous diseases arising from the same constitutional vice into one another than a substitution, and is very different from the substitution of other diseases for small-pox so unphilosophically, and, as above shown, so erroneously, asserted, without, so far as I know, the adduction of a single corroborative fact.

TABLE shewing the average ANNUAL MORTALITY of LONDON from all Causes, and from Affections of the Chest, Fevers, Strumous Diseases, and Small-pox, in three periods of Ten Years each, viz., from 1681 to 1690, from 1746 to 1755, and from 1846 to 1855, inclusive.

DATE.	* Population of the Metropolis within the Bills of Mortality.	AVERAGE ANNUAL NUMBER OF DEATHS.						AVERAGE ANNUAL DEATH-RATE PER 10,000 PERSONS.					
		Average number of Deaths in each of the Ten Years.	† Average Annual number of Deaths from Pulmonary Affections, including Pneumonia.	Average Annual number of Deaths from Pulmonary Affections, exclusive of Pneumonia.	Average Annual number of Deaths from Fevers.	Average Annual number of Deaths from Strumous Diseases.	Average Annual number of Deaths from Small-pox.	Death-rate per 10,000 persons calculated on a Ten Years' average.	Average Annual Death-rate from Small-pox, per 10,000 persons.	Average Annual Death-rate from Pulmonary Affections (including Pneumonia) per 10,000 persons.	Average Annual Death-rate from Pulmonary Affections (exclusive of Pneumonia) per 10,000 persons.	Average Annual Death-rate from Fevers, per 10,000 persons.	Average Annual Death-rate from Strumous diseases per 10,000 persons.
1681–90	530,000	22,362	3,673(a)	3,673(a)	3,356(e)	4,248(g)	1,664(i)	421·0	31·39	69·3(n)	69·3(n)	63·3	80·1
1746–55	653,900	23,216	4,804(b)	4,804(b)	3,526(e)	7,183(g)	1,991(k)	355·0	30·44	73·4	73·4	53·9	109·9
1846–55	2,362,236	59,014	16,131(c)	12,481(d)	9,112(f)	4,886(h)	799(l)	249·0(m)	3·38	68·2	52·8	38·5	20·6

* The population is given according to the estimate formed for the middle year of the series, viz., King's computation for 1685; a computation published in the "Companion to the Almanack" of 1828 for 1750; and the Census of 1851. King's calculation is considered to have been a very fair approximation; but, if in error, it was rather in excess of numbers than the contrary. The estimated population of 1750 is also probably in excess; for if we admit King's estimate as correct, it makes the ratio of increase between 1750 and 1801 to have been somewhat less than that between 1685 and 1750, which is unlikely, seeing that the proportion of deaths to births was constantly decreasing during the latter portion of the 18th century.

† Upwards of 1,000 deaths annually are set down as caused by "Old Age." Undoubtedly many of these would now find a place under Pneumonia and Bronchitis.

(a) "Consumption and Tissick," "Pleurisy," and "Cold and Cough."

(b) "Consumption," "Cough," "Asthma and Tissick."

(c) Diseases of the respiratory organs and Phthisis.

(d) Phthisis and diseases of the respiratory organs, minus Pneumonia.

(e) Consisting of the articles "Fever" and "Spotted Fever," therefore probably including Scarlet Fever and cases of cerebral and pulmonary disease, attended by much heat of skin.

(f) Comprising Scarlet Fever, Remitting Fever, Infantile Fever, Typhus, Cephalitis, and Pneumonia.

(g) "Convulsions," "Rickets," "Water-in-head," and "Evil."

(h) Scrofula, Tabes-mesenterica, Hydrocephalus, and Convulsions.

(i) In three of these years Small-pox greatly exceeded the average.

(k) In four of these years Small-pox greatly exceeded the average.

(l) In four of these years the average was greatly exceeded, and in 1848 more than doubled.

(m) The death-rate of the portion of the present metropolis comprehended within the limits of the old Bills of Mortality is somewhat higher, being nearly 260 in the 10,000.

(n) Pneumonia is not distinguished as a separate disease in the old bills. It has been excluded in the second calculation, under the belief that it would formerly be set down as "Fever."

Another assertion which has been made in reference to the employment of vaccination as a prophylactic of small-pox is, that although the practice of vaccination has tended to prevent death in early life, this advantage has only been temporary, and has been more than counterbalanced by the increased number of deaths at a later period; and, that viewed as an economical question, the result has been to add to the public burthens by lengthening the existence of a class of lives that cost the community much, but are cut off as soon as they reach the productive period of life, and before they have contributed their proportion towards the common stock. Even if this were true it would be but a questionable argument against vaccination, for vaccination would be a great boon if it led to the prolongation of life only for a brief space; and especially if, in consequence of its use, the feeble members of the community were cut off by non-contagious, less loathsome, and to those who survive less disfiguring diseases, than small-pox. Fortunately there is no difficulty in disproving this mischievous assertion, which, like that already disposed of, is untrue, and has been apparently made without any investigation of the real facts. For this purpose it is necessary to compare the mortality at different periods of life, anterior and subsequent to the introduction of vaccination. I have accordingly selected four periods of ten years each, during the last and present centuries, for this comparison. Commencing with 1728, being the first year in which the ages of the dead were published in the bills of mortality, I have abstracted from the returns the number of deaths at all ages, and at each of the principal periods of life, for the ten years ending at Christmas, 1737. From the data thus obtained the numbers dying at each period of life out of every thousand of the dead have been calculated. Allowing intervals of thirty years to elapse between each series, similar calculations have been made for the ten years between 1768–77, and again between 1808–17. Lastly, I have made the like calculation for the ten years from 1842 to 1851 inclusive, being compelled to take these particular years instead of allowing an interval of thirty years to elapse, because the periods of life at which deaths have taken place are differently arranged in the Registrar General's Reports since 1851.

The accompanying table, which exhibits the results of this investigation, together with the principal data upon which they are founded, incontestably proves that the ages of the dead in London do not afford the semblance of support to the alleged statement. The facts shewn by the table are indeed just the reverse of the assertion; for it is evident, that whilst there has been a large diminution in the mortality at the early periods of life, there has likewise been a large increase in the number of deaths at the more advanced age of sixty years and upwards since the introduction of vaccination. Thus, we learn from the table, that whilst the deaths of children under five years of age have fallen from 474 to 399, or nearly one sixth out of every thousand deaths at all ages, during the interval between 1737 and 1842, those of persons who have survived to the age of sixty and upwards, have, during the same period, risen from 121 to 203, or in the proportion of ten to six. Again, the deaths below the age of twenty have fallen from 541 out of each thousand deaths during the ten years comprised between 1728-37 to 485 in the ten years 1842-51, or about one ninth. As might have been anticipated, the variations in the middle period of life, between the ages of twenty and sixty, have been less; the changes have also been less constantly in one direction, but the fluctuations have been small, and lend no support to the opinion that the diminished number of deaths anterior to the age of twenty has been attended by an increased mortality in early manhood. It must, moreover, be recollected, that the figures in the table do not represent death-rates, and that a diminished number of deaths at the early period of life necessarily increases the proportion of deaths at the subsequent ages. If, therefore, whilst the value of life under twenty years of age had improved as much as it has during the period over which this investigation has extended, the expectation of life to persons that should attain the age of twenty had remained stationary, the result of the lessened fatality of early life would have shewn itself in a table of this kind by a large increase in the proportion of persons dying between the ages of twenty and sixty. The truth, however, is, as we have seen, that, whilst the fatality of early life has been steadily diminishing, the number of persons who attain to a good old age has as regularly increased; for, whereas the deaths of persons aged sixty years and upwards, during the decennium 1728–37, fell short of one eighth of the entire mortality, the deaths of the same class in the decennium 1842-51 exceed a fifth of the whole number of deaths.

In truth, from the two main facts set forth in this paper—the diminished death-rate of several diseases, and the increased value of life in the present day—we might, with reason, turn the tables on the opponents of vaccination, and infer, that, apart from the prevention of small-pox, vaccination has been a great blessing to the human race, since the diminished mortality from strumous affections, and perhaps from some other diseases, is partly to be ascribed to the greatly lessened prevalence of so powerful a cause of their development as this formidable exanthem must have been in those who recovered from the immediate attack.

TABLE shewing the total Mortality of London, the total number of Deaths at Four several Periods of Life, and the Proportion of Deaths to 1,000 Deaths at all Ages, at each of these periods, for four series of ten years each, in the 18th and 19th centuries.

DATE.	Total number of Deaths in each period of 10 years.	Total number of Deaths at each period of life in 10 years.				Composition of every 1,000 Deaths, according to the ages of the dying.			
		Under 5 years.	Between 5 and 20.	Between 20 and 60.	60 and upwards.	Under 5 years.	Between 5 and 20.	Between 20 and 60.	60 and upwards.
1728–37	267,150	126,744	18,017	90,004	32,385	474	67	338	121
1768–77	221,189	102,213	16,639	72,670	29,667	462	75	329	134
1808–17	188,814	74,940	14,044	65,864	33,966	397	74	349	180
1842–51	532,260	212,740	45,511	116,052	107,957	399	86	312	203

J.

COPY of CIRCULAR LETTER addressed to MEMBERS of the MEDICAL PROFESSION in the United Kingdom and elsewhere; with the ANSWERS thereto alphabetically arranged.

General Board of Health, Whitehall,
October, 1856.

SIR,

I take the liberty of begging you to oblige me by reading and answering the questions printed overleaf in reference to the subject of Vaccination.

You are probably aware that, during the last Session of Parliament, this important subject was brought under notice of the House of Commons, with a view to certain required improvements in our existing law; and that at this opportunity, persons, hostile to Vaccination, revived some of the old objections to its practice.

Press of other business in the House of Commons having for the time rendered it impossible to proceed with the intended legislation, those objections were not publicly discussed.

The President of the Board of Health intends, however, forthwith on the meeting of Parliament, to move the House of Commons for a Select Committee on the entire subject; which Committee, if appointed, would no doubt receive whatever evidence can be adduced as to the hygienic value of Vaccination, and as to the validity of any medical objections alleged against its further encouragement by the State.

With a view to such an inquiry, I am now very desirous to collect statements from eminent members of my Profession, expressing their individual experience on certain mooted questions.

It appears of high importance to mankind, that there should prevail no removable uncertainty with respect to those vast advantages which Vaccination purports to confer; and I therefore venture to hope you may not consider it too troublesome a request when I earnestly beg you to favour me, for the public service, with the fruits of your personal experience.

I am, Sir,

Your obedient servant,

JOHN SIMON,

Medical Officer to the Board.

To

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
1. **Abercrombie, John**, M.D., (Cheltenham), Physician to the General Hospital.	I have not.	Not the slightest.	Not practising as a surgeon, I have no experience on this point.	I do most strongly.
2. **Ackerley, Rich. Yates**, (Liverpool).	None whatever.	No; provided the vaccine matter be fresh, and obtained from a healthy child.	I have no doubt that syphilis has been communicated from a diseased to a healthy child by means of vaccination, and also think it probable that scrofula may be. I have frequently seen erysipelas, diffuse inflammations, &c. follow upon the operation.	Most decidedly.
3. **Acland, Hy. W.**, M.D., F.R.S. (Oxford), Physician to the Radcliffe Infirmary.	Not the slightest doubt.	None whatever.	I have no knowledge on this point.	Yes. But I believe that it has been unskilfully and negligently and inefficiently performed hitherto.
4. **Acton, W.**, (London.)	(See Suppl., page 118.)	—	—	—
5. **Adams, John**, (London), Surgeon to the London Hospital.	None whatever.	Assuredly not.	No.	Yes.
6. **Adams, Robt.**, M.D., Dublin), Surgeon to the Richmond Hospital.	I have no doubt that successful vaccination does prevent attacks of smallpox, and that the exceptions to this rule are rare. Also, that the modified smallpox is a comparatively mild disease. Appeal to any one of 60 years of age, and ask him if, in the theatre or church, he sees *now* the number of persons seamed by smallpox he did formerly; not to mention the deaths he has known, even from the inoculated smallpox.	I see no ground whatever for such a notion.	I have in my experience never known anything of this kind. On the other hand, is it not also to be objected to inoculation by smallpox that, through it, syphilitic or scrofulous infection might be introduced? If there be anything in such a theory, it applies to both; and inoculation by smallpox introduces constantly fresh sources for contagion.	Every medical man I know, who has children, does as I do myself; he vaccinates them, as a matter of course; and also recommends vaccination to others, except "for special reasons in individual cases."
7. **Addison, Thomas**, MD.,(London), Physician to Guy's Hospital.	I have none whatever.	I have not. Occasionally I have known some slight constitutional derangement succeed to the process of vaccination, attended with, or followed by, disorders of the digestive organs, which has appeared to favour the developement of ecthyma, rupia, scrofula, and such like; but nothing either very serious or special; meaning by special, any disorder different from what might follow any other exanthematous disorder.	To both these propositions my own experience would return a negative, although I should at all times be anxious to have the lymph taken from a child in good health in other respects, and of naturally good constitution.	I do.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence, a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
8. **Alderson, Jas.**, M.D., (London), Physician to St. Mary's Hospital.	None whatever.	Certainly not.	No; but as a Commissioner of the Vaccine Board I am aware of a single instance, some years ago, of bad results following vaccination with a lancet ascertained to have been foul, and accidentally used in ignorance.	Certainly.
9. **Alford, Henry**, (Taunton), Surgeon to the Taunton and Somerset Hospital.	I have no doubt of it whatever.	I have never had any reason to think, nor do I believe, that vaccinated persons are in any way injured in their health, or are rendered more susceptible to any disease, by vaccination.	No.	I do, most strenuously.
10. **Alison, W. P.**, M.D., (Edinburgh), First Physician to Her Majesty, for Scotland, Emeritus Professor of Medicine.	I have none whatever; and consider the question to have been fully and satisfactorily decided by facts to which I refer in a separate paper, sent herewith. (See Supplement, page 119.) It is to be observed, however, that the poisons producing all epidemic diseases are subject to variations, sometimes rapid, sometimes very gradual, both as to intensity and to several of the effects they produce; which makes it right to have the evidence of the efficacy of any such protecting power as cowpox has shewn now for years subjected to examination from time to time, with the view of ascertaining whether any such modification of its usual power has taken place. But as to the vaccine matter, it appears from the statements to which I refer that there is no evidence whatever of diminution of its power, either preventive or mitigatory, over smallpox, in the last fifty years.	I have not; but having often seen scrofulous, especially tubercular diseases, originating during the feeble state of convalescence from bad smallpox, and being aware that smallpox, before vaccination was introduced, was always stated to be a *mutilating* when not a fatal disease, I have no doubt that whatever prevents smallpox in a population will save many of that population from scrofulous and tubercular disease, otherwise to be fatal to them. I send some further observations on this point also. (See Supplement, page 119.)	I have known a few cases in which both syphilitic and scrofulous cutaneous affections have been apparently communicated by attempted vaccination, or by any other incision of the skin; but such cases are not to be regarded as instances of vaccination. The only practical question they suggest is as to the time and mode of real vaccination of such children afterwards.	I do. In general, before the first dentition; and have no doubt that with a little patient management it may be rendered a popular measure.
11. **Allen, James**, (York), Lecturer on Midwifery at the School of Medicine.	I have no doubt. The exemptions are few, and all such cases generally mild and modified. In an extensive field of observation, for above 30 years, I have only seen one fatal case of smallpox after vaccination.	Decidedly not.	I have no reason to suspect vaccination a vehicle of syphilitic infection, although I have no doubt, under unfavourable combinations of circumstances, that vaccination, like other influences that affect the constitution, occasionally gives rise to morbid action where there is a scrofulous diathesis, but only as a common cold or a dose of physic will sometimes do.	Vaccination should be performed in early infancy. The rule is excellent, under three months. The derangement of health is far less under this period than any afterwards. From the commencement to the full close of the period of dentition, all children are more susceptible to influences that affect health, and the course of vaccination is not so steady as before this time.

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12. **ALQUIÉ**, M.D. (Montpellier) Professeur of Clinical Surgery to the Faculty, &c. &c.	D'après mon expérience, et d'après le sentiment presque unanime des médecins du midi de la France, je ne saurais mettre en doute l'immunité dont jouissent ordinairement les individus vaccinés contre l'affection variolique. Ils sont pour la plupart à l'abri des atteintes de la petite-vérole. Ainsi il me parait que les quatre-cinquièmes environ des sujets vaccinés ne contractent pas la variole ; rarement cette affection exanthématique se déclare chez les enfans vaccinés depuis peu d'années ; le plus souvent ce sont les adolescents ou les adultes qui nous ont offert le développement de la variole. D'après ce résultat de l'observation clinique, et d'après les révaccinations que nous avons pratiquées sur des sujets de cette dernière catégorie, nous ne sommes pas éloigné d'admettre l'utilité de la révaccination des adolescens, ou des adultes, surtout au moment où une épidémie de variole grave règne dans les contrées voisines et commence d'envahir celle où le practicien exerce. Suivant ces remarques nous sommes porté à croire que l'influence préservative de la vaccine diminue avec les années, et que le virus vaccin perd de sa vertu à travers les générations. De là l'utilité de reprendre de temps en temps ce virus à sa source première. Alors même qu'ils contractent la variole, les individus vaccinés succombent fort rarement. Toutefois il me semble nécessaire de faire à cet égard une distinction. Durant des épidémies meurtrières ou malignes de variole survenues en des villages de nos contrées, les personnes depuis longtemps vaccinées ont fourni un certain nombre de victimes au fléau. Il en a été très rarement ainsi pendant l'évolution sporadique et saissonnière de la variole. La plupart des sujets vaccinés ont été alors épargnés, et ceux qui en ont été affectés nous ont presenté des cas presque toujours bénins des varioles discrètes, de varioloides, des varicelles. Lors même que la variole se montrait confluente elle n'en epargnait pas moins alors la vie de ces sujets. La vaccine possède donc une vertue précieuse et incontestable.	Je ne saurais admettre l'antagonisme que certaines médecins ont voulu établir entre la variole d'une part, la fièvre typhoïde, les scrofules, la phthisie pulmonaire, et plusieurs autres maladies de l'autre. L'expérience et l'observation me semblent condamner une pareille hypothèse ; la plupart des maladies dont on voudrait faire les antagonistes de la variole existaient bien longtemps avant celle-ci. Pour avoir revêtu assez recemment le nom de fièvre typhoïde, la fièvre maligne n'en est pas moins une affection très ancienne. Les mauvaises conditions de l'hygiène et les diverses causes debilitantes qu'engendrent si fréquemment les scrofules, la phthisie pulmonaire, les emanations putrides, si favorables à la fièvre maligne, sont indifférentes à la formation de la variole, qui possède un virus spécifique que l'on cherche vainement dans la pathogénie de ses prétendus antagonistes. La marche du mal, le siège des altérations organiques, la méthode de traitement, les indications, et les moyens thérapeutiques les mieux appropriés, fournissent tous autant de caractères trop différents pour assimiler la variole aux autres affections morbides.	La spécificité des virus étant selon moi un fait incontestable, il ne me parait pas possible que la vaccine puisse transmettre une maladie autre que la vaccine. Ainsi les virus variolique, syphilitique, &c., ne sauraient communiquer des affections différentes de celles d'où ils proviennent. La transformation des natures morbides les unes dans les autres me parait dénuée de réalité. Je ne saurais donc admettre que la lymphe empruntée à une pustule indubitablement vaccinale , puisse transmettre à l'individu vacciné non la vaccine mais la syphilis, les scrofules, ou quelque autre maladie. Toutefois, l'association et la complication des affections morbides est aussi un fait journellement démontré dans la pratique. La scrofule se complique assez souvent de syphilis, qui se montre en même temps que le rhumatisme, les dartres, &c., chez certains autres individus. Il se pourrait donc que le virus vaccin emprunté à un sujet entaché d'affection syphilitique, ou de telle autre affection *spécifique*, communiquât en même temps deux lésions morbides. Cette conclusion est basée sur des principes qui me paraissent fondés, mais dont il ne m'a pas été donné de faire la vérification directe. Neanmoins il ne me semble pas plausible d'admettre qu'un véritable praticien ait pu accidentellement implanter par la piqure vaccinale une maladie autre que l'affection protectrice qui résulte d'une vaccination bien faite.	La vaccine est une maladie tellement innocente par elle-même, l'influence avantageuse qu'elle exerce sur l'homme est si manifeste dans la plupart des cas, qu'il me parait sauf en de rares exceptions, non seulement sans inconvénient mais encore fort utile de la pratiquer chez tous les sujets. La première enfance, et surtout la première année après la naissance, est l'époque la plus convenable pour la vaccination. La compétence de l'opérateur et les diverses précautions d'usage sont nécessairement supposées.

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13. **Amphlett**, S.H., (Birmingham), Surgeon to the General Hospital.	None whatever; and I am of opinion that in all cases after successful vaccination no cases of death occur from smallpox, unless combined with some other acute disease.	Certainly not.	I have not; and I am not aware that unintentional inoculation in the hands of a duly educated medical practitioner has ever occurred.	I have always recommended children, when healthy, to be vaccinated when six weeks or two months old, and unless there are special reasons for deferring the operation I am of opinion that it should then be performed.
14. **Ancell, Henry**, (London).	No. The causes of the failure of vaccination, according to my observation, are twofold: 1. Carelessness in the operation by the use of foul or blunt instruments, producing an irritative wound, and modifying the specific influence by phlegmonous or erysipelatous inflammation. The vaccine vesicle runs a modified course; the lymph has a tendency to become quickly sero-purulent; the size, shape, and tint of the areola present shades of difference obvious to a practised eye, but I believe often overlooked by the careless operator. In this case, speaking theoretically, I should say the local disease runs a course which satisfies the operator; but the necessary molecular change in the blood, which constitutes the prophylaxis, is prevented by the interruption of the natural process in the part. 2. The use of lymph in which the specific power has been weakened or modified by ulterior changes. The very general practice is to use lymph of the eighth day; just because it is very convenient to adopt "*this day week*" for the return of the infant to supply the lymph for others. Putting out of the question exceptional cases of lymphatic or slow constitutions, I protest against the eighth day as a *general rule*, as being too late; and I affirm that the commencement of the seventh day is far better. On the eighth day, generally speaking, ulterior changes have commenced in the lymph; and I believe it often operates as a snare and a delusion, powerful enough to produce a local disease, only so slightly modified in its aspect that it may pass for being perfect, but still often sufficiently modified to prevent the production of the essential molecular change in the blood; the constitutional disease.	No.	As respects scrofula, my reply is the same as before. Scrofula is not so prevalent now as in the time of James the Second; and, although there are many hygienic causes of amelioration, if vaccination tended to propagate the disease, its very general use would have counteracted the whole of these causes of amelioration. I have never seen an instance of the unintentional inoculation of syphilis or any other disease. As respects phthisis, the proportion of deaths generally to the deaths from this disease, in the metropolis, appears thus in the recorded statistics: In the year 1700 1000 deaths=145 phthisis. " 1801 1000 " =263 " " 1850-2 1000 " =126.6 " Neither inoculation nor vaccination were resorted to in 1700; vaccination was but just coming into use about 1801; smallpox was totally unopposed by these processes, and yet, to say the least, consumption was as frequent as at present. If vaccination, or any process which arrests the progress of smallpox, tends to the increase of consumption, consumption ought to be much more frequent (*cæteris paribus*) at present than formerly. Although the statistics are very crude, perhaps they are sufficient to show conclusively that vaccination cannot conduce to the occurrence of consumption.	Yes. ?

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15. **Anderson, Alex.**, M.D. (Jedburgh), Physician to the Dispensary.	None. Eleven years' experience in China, where smallpox appeared annually as an epidemic, more or less severe among Europeans and Chinese, among whom a considerable proportion were vaccinated, as well as 14 years' experience in this country, have produced the strongest conviction on this point.	None whatever.	None.	Most decidedly.
16. **Andrew, H.**, (Truro), Surgeon to the Royal Cornwall Infirmary and to the Truro Dispensary.	Certainly not.	Certainly not.	No.	Yes.
17. **Andrews, J.**, (Salisbury), Surgeon to the Infirmary.	I believe that successful vaccination does exempt a considerable number of those persons subject to its influence (but for a certain time only) from attacks of smallpox; and I believe it is almost an absolute security against death by that disease.	No.	No.	I do. But I am also of opinion that inoculation of the the smallpox *after* vaccination would be desirable. At present, I have reason to believe that very many are answerable to smallpox after a certain number of years. And, although I am not aware of any deaths in consequence, yet I have witnessed several severe cases of confluent smallpox after vaccination in early life; and have also re-vaccinated ad with success, when I have had reason to know positively that they had undergone the operation with equal success in infancy. Under the present system of a single vaccination in early life, no one, in my opinion, is safe from an attack of smallpox in after-life, which might, or might not, be of a severe character.
18. **Andrews, O.**, (Monmouth), Surgeon to the Dispensary.	No.	No.	No.	Yes.
19. **Arnott, Jas. Moncrief**, (London), formerly Surgeon to the Middlesex Hospital, and past President of the Royal College of Surgeons.	I have no doubt.	I do not believe in any of these suppositions.	I do not.	As a rule, I recommen that vaccination should be performed at an early period of life.

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20. **Association**, Medical, of **Frankfort-on-Main** through **Dr. Professor Varrentrapp.**	Vaccination guards against variola in the immense majority of cases, and particularly until the years of puberty. According to the experience made in the St. Rochus Hospital of this place, there appears to be no substantial difference in the course and prognosis of variola in vaccinated and non-vaccinated persons in cases where the disease attains a complete development; there is even no such difference in favor of those who have suffered from variola once before. It must, however, be remarked that in the plurality of cases of vaccinated individuals being befallen with variola the disease proves abortive and is defeated. N.B.—In a village near Frankfort, from 40 to 50 cases of smallpox were met with in the year 1839; and the few deaths which occurred were all in not vaccinated persons.	We do not think that hitherto any reasons or facts are forthcoming to justify answering this question in the affirmative. The assertions of Carnot, Bayard, Nittinger, and the like have, at least as it seems to us, no positive basis. The objections of the adversaries of vaccination must be founded on better reasons ere we can be requested to deliver counter-evidence.	(*a*) We do not know of any irrefragable proof as to such a transfer of scrofulous, syphilitic, and other dyscrasial diseases having taken place. Moreover the thing would not easily admit of being proved, since a conscientious physician never will take matter from children befallen with such diseases. (*b*) With due attention, decidedly, no.	All the members of the Medical Association pronounce an absolute **Yes**. It is to be recommended. In Frankfort vaccination was recommended as advisable on Nov. 20, 1805, and legally introduced under French authority, Sept. 6, 1811. There is at present no direct compulsion exercised as to vaccination, but an indirect one; inasmuch as for reception into infant and other schools, apprenticeship, menial service, the army, the freedom of the city, a certificate of vaccination is required. Besides, among us, public opinion is without exception so favorable to vaccination that here, where vaccination is accessible to everybody, it does not happen that children grow some years old without being vaccinated. N.B.—In Frankfort during the forty years 1816–55, there have been 869 cases of smallpox of which 28 were fatal.
21. **Association** of Poor Law Medical Officers of the City of London, through **Dr. Lobb.**	No.	No.	No.	Yes.
22. **Astley, Edward**, M.D. (Dover), Physician to the Hospital and Dispensary.	I have no doubt.	No.	No.	Certainly.
23. **Axford, R.**, (Bridgewater), Consulting Surgeon to the Infirmary.	None.	None.	None.	Yes.
24. **Babington, B. G.**, M.D., F.R.S., (London), President of the Epidemiological Society: formerly Physician to Guy's Hospital.	None whatever, provided the vaccine virus be taken at the proper stage from a perfect vesicle, and the operation of applying it be skilfully performed.	I have no reason whatever for thinking so.	I have not.	I do.
25. **Bacot, John**, (London), Consulting Surgeon to the St. George's and St. James's Dispensary.	I have no doubt that vaccination properly performed is a security against smallpox, in the great majority of cases; and I have never seen death as the result of the attack of smallpox after vaccination.	I have no reason to think so.	I know of no such instances as are suggested in this question.	No doubt the early performance of vaccination is advisable in most cases.

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26. **Baker, A.**, F. R. C. S. (Birmingham), Surgeon to the General Hospital.	I have no doubt that efficient vaccination entirely exempts the large majority of those who are submitted to it from smallpox; and that then, if it does not do this, it modifies the disease, and renders it less dangerous. Fatal smallpox does occur after vaccination; but that does not disprove the general utility of vaccination. The worst case of smallpox, that ever fell under my notice, was one in which the patient was covered with "pits" from previous smallpox.	No susceptibility to other diseases has been observed by me, as the result of vaccination. I have seen erysipelas induced by this small operation; but this has resulted from the *wound* in an unhealthy subject, or during the prevalence of a vitiated condition of the atmosphere, and *not from the virus* being taken up into the blood. Once, I vaccinated a nævus, and pyæmia followed, which ended in the formation of several secondary superficial abscesses; but the child recovered.	(*a*) No. In the first place, I do not believe that scrofula or constitutional syphilis can be thus propagated; and secondly, I should not select a child with any cachexia as a source for the supply or dissemination of vaccine lymph. (*b*) The characters of the vaccine vesicle are so well known to all properly well-educated men that no other vesicle could, in my opinion, be mistaken for it, however inadvertent the surgeon might be.	I do. The period fixed by law exposes vaccination to objections arising out of popular prejudices. It is one in which children are often teething, during which they are prone to affections of the skin, brain, chest, and abdomen, and, by the uneducated, these results of dentition are attributed to vaccination with impure virus. Despite this, so important is it, in my estimation, to protect the tender infant from the dangers of smallpox, that I have repeatedly performed the operation before the period now insisted upon by the "Act."
27. **Balfour, T. Graham**, M.D., (London), Surgeon to the Royal Military Asylum, Chelsea.	I have not the least doubt on this point. The accompanying paper (Appendix E.) drawn up by me in 1852 affords very strong statistical evidence in support of this opinion. I beg to call attention especially to part of the paper where the exemption from smallpox among our troops serving in the colonies is clearly demonstrated; and also to another part, where the evidence derived from the records of the Royal Military Asylum is stated. I am not aware of the existence of any other evidence of the same description.	I have no reason to suppose that vaccinated persons are rendered more susceptible of phthisis or any other disease by having been vaccinated. The very low rate of mortality among the boys of the Royal Military Asylum ($4\frac{5}{10}$ per 1,000), all of whom have been vaccinated, affords presumptive evidence that their health is not disadvantageously affected in consequence of having undergone vaccination.	No. I have never seen any case which would justify such a suspicion. During the eight years I served in the Grenadier Guards I had ample opportunities of observation on this point, as all the recruits who joined the regiment were vaccinated, or revaccinated, unless they bore unequivocal marks of smallpox. In no instance did any symptoms ever occur, or any appearance present itself, which could lead to the suspicion that the lymph had been a vehicle of syphilitic, scrofulous, or other constitutional infection.	Certainly. If the operation be delayed till the age of puberty you are most unjustifiably exposing the child for some years to the risk of a very fatal disease, and one which, if not itself fatal, very often develops others, such as phthisis, scrofula, &c.
28. **Baly, Wm.**, M.D., F.R.S., (London), Physician to the Milbank Prison and Assistant Physician to St. Bartholomew's Hospital.	None whatever.	None. (See Supplement, p. 124.)	I have met with no facts suggesting such a belief or suspicion.	I do, for I have no doubt that the nearly universal practice of vaccination at an early period of life would not only directly increase the number of those protected against the smallpox virus, but would so lessen the amount of the virus generated, that those still susceptible would more and more rarely be exposed to infection; and the disease would in process of time become almost extinct.

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29. **Bamberger**, H., (Würzburg), M.D., and Professor of Medicine in the University.	The preservative power of inoculation is indeed not an absolute one, and seems after a certain number of years to be weakened or even lost. However, the greater number are certainly not befallen with smallpox; and wherever this happens, the form in which the disease is developed, is, as a rule, less severe, [the so-called variola modificata,] and mostly tending to a very mild course. Accordingly a fatal issue is proportionally rare. In the great hospital of Vienna, in which I was formerly employed, and where more than 20,000 patients a year are treated, there occurred in the course of three years 1,713 cases of smallpox, 136 of which had a fatal issue. That ratio, although apparently not a small one, is very favourable indeed when compared to the ratio of fatal cases in other acute diseases, particularly smallpox itself, as it prevailed before the discovery of vaccination; and when, further, it is taken into account that a not inconsiderable portion of those individuals had not been vaccinated. Vaccination, it is true, is of legal obligation in Austria; but it is very often evaded in those less cultivated provinces of the realm, from which the class of labourers and handicraftsmen in Vienna are chiefly recruited. In Bavaria, vaccination is more strictly managed; and during the two years and six months that the direction of the hospital here has devolved upon me, (in which rather more than 4,000 patients a year are treated,) I have not met with a single fatal case of smallpox.	The notion that through vaccination the tendency to typhus, scrofulosis, phthisis, etc. may directly or indirectly be increased, is, according to my conviction, an altogether erroneous one; the causes of the frequent occurrence of these forms of disease must rather be looked for in our social relations. In the Hospitals of Constantinople and Smyrna, which I visited in 1851, I met with tuberculosis and typhus just as frequently as among us, although as far as I know people in those countries have scarcely any knowledge of vaccination.	I am indeed convinced that *contagious* disease, syphilis for instance, is communicable with the lymph in vaccination; nay, such a case has even happened a short time ago in a town but a few miles distant from this place. After due inquiry into all circumstances of the case the practitioner was found guilty by the court of justice and condemned to prison for several months. From this, however, no other conclusion is to be drawn, than that it is necessary before vaccinating, to satisfy oneself of the healthiness of the child from whom lymph is to be taken. On the other hand, that other constitutional but not contagious diseases, as scrofulosis, tuberculosis, &c., can be transferred in the same way, is in my opinion altogether unproved. Likewise I think it impossible that a well-educated physician could mistake between the vaccine vesicle and any other product of disease.	According to my firm conviction, the general vaccination of infants by well-educated practitioners is a thing to be unconditionally recommended.
30. **Banner**, J. M. (Liverpool), Consulting Surgeon to the Northern Hospital.	I have not any doubt that vaccination confers a great benefit, exempting many from smallpox, and rendering those vaccinated almost secure from death by that disease.	I believe that phthisis and scrofulous diseases, generally, are on the increase, and this to a great extent. I never ascribed this to vaccination; nor do I believe that vaccinated persons become more susceptible to other infective diseases.	I am satisfied that no such circumstance as here alluded to ever occurred in my practice or under my knowledge. I have heard people ascribe cases of porrigo and eczema to vaccination; but I never did so myself.	Most certainly. At the same time I recommend that one simple certificate should be a sufficient testimony of its due performance; and that complicated requirements should be avoided. The medical practitioner might sign a certificate furnished by the registrar to the patient.

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31. **Banning, T. H., M.D.,** (Liverpool) Consulting Physician to the Royal Infirmary.	I have for some years retired from practice; but I feel it a duty to reply, as far as I can, to the questions herein stated. Towards the end of the year 1800, or beginning of 1801, I witnessed, as a pupil of the late Mr. Minshall (soon after elected one of the surgeons of the Liverpool Infirmary,) the first instance, I believe, of inoculation in that town with cowpox, on the person of his own son, J. L. Minshall, now Inspector to the Southern Hospital there; and having, as Physician to the Liverpool Dispensary from 1810 to 1817, and as Physician to the Fever and Smallpox Hospital from 1817 to 1832, had numerous opportunities of observing the advantages of vaccination, not only as a mild and safe disease, but, when effectually performed, an almost preventive to smallpox, I can and do conscientiously state my full belief in the efficacy of vaccination as expressed in this question.	I believe that vaccinated persons, in being thereby rendered less susceptible of smallpox, do not become more liable to other infective diseases, or to phthisis; and that their health is not disadvantageously affected thereby.	My sincere conviction is, that syphilitic, scrofulous, or any other constitutional infection, is not communicated through vaccination; and I do not recollect to have met with a single instance of the kind.	I am a decided advocate for the performance of vaccination, at as early a period of life as possible; especially after the first month from birth.
32. **Barber, E.,** (Stamford), Surgeon to the Stamford and Rutland Infirmary.	None. When vaccination fails to afford perfect immunity from smallpox, it so modifies the disease that the malady is, in almost all cases, a very slight one; and the eruption is generally what, in the times when inoculation for smallpox was practised, would have been regarded as chickenpox, in some one of its varieties of waterpox, swinepox, stonepox, &c. I have known only one instance of a fatal termination of smallpox after vaccination. It was the case of a medical student, who caught the disease from the dissection of a child brought into the dissecting-room of St. Thomas's Hospital, and who had died of smallpox: four students took the disease from it, one of whom died. I believe that, except in a comparatively small number of cases, vaccination gives absolute security. The exceptions I suppose to arise from some constitutional peculiarity; as we know that smallpox has been repeated (sometimes more than once) both after inoculation, and after the occurrence of the disease in the natural way. Upwards of 30 years' observation has satisfied me of its protective and preservative power; for, whenever smallpox has occurred within my knowledge, and all the persons around have been carefully vaccinated, it has never, in any instance, failed to arrest the progress and extension of the disease.	No.	I do not think that lymph carefully taken from a true Jennerian vesicle is ever a vehicle for syphilitic, scrofulous, or other constitutional infection to the vaccinated person. But it is very possible that sufficient care is not always taken in opening the vesicle, so that a minute quantity of blood is mixed with the lymph; and we know not how small a quantity of blood may suffice to convey a constitutional or other taint. Transplanting teeth was, at one time, practised; and I believe it was found that syphilitic, and other maladies, were transferred with the teeth; hence, the discontinuance of that practice. I have sometimes had vaccine lymph sent to me slightly coloured, but have not used it, lest it should do mischief. I do not think that unintentional inoculation with any other disease, instead of vaccination, can have occurred among duly educated medical practitioners; the characters of the vaccine vesicle are too well known and too distinctive for such a mistake to occur; the vesicles of chickenpox may, in some cases, resemble them, but the history of the case will rarely, if ever, fail to distinguish them.	I think vaccination should be performed in early life, but I think it possible that it may be done at too early an age. It is known that infants of very tender age (as during the period of suckling) are less susceptible of some diseases (as, for instance, fever), than persons who are older; and it is possible that this comparative insusceptibility may apply to some other diseases; and that, in the cases of very young children, the constitutional changes effected by vaccination may be less perfectly developed, and the child therefore less perfectly influenced and protected, than if it had the disease at a later period. This is only conjecture, and scarcely admits of proof, except by experiment and extended observation; but it seems to me to be worthy of consideration in fixing a period within which vaccination shall be compulsory. Three or four months is, I think, too short a period, and would often be productive of inconvenience if strictly adhered to. I was taught, and have always practised, the plan of vaccinating in the spring and early autumn;—avoiding the *summer*, because, in cases of robust children, when the weather is hot, there is often so much inflammation that the vesicle or pustule partakes rather of the nature of a common boil than the vaccine vesicle, and will sometimes slough out altogether, leaving it doubtful whether any constitutional effect at all has been produced;—and avoiding also the *winter*, because, in the cases of weakly children, it is not desirable to expose them to any illness, however slight, during the time of the year that they are scarcely able to maintain their health in the midst of opposing influences; and because, in almost all cases when the weather is cold, the vaccine vesicle is longer in forming, and generally comparatively small; and, even in the cases of very robust children, the disease appears to be more tardy in its action: whether on that account it is less efficacious I am unable to say. But I have always preferred those seasons of the year (spring and autumn), when these irregularities may for the most part be avoided.

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33. **Barham**, C., (Truro), Senior Physician to the Cornwall Infirmary.	None whatever.	To the former clause of this query, I should answer no; to the latter, that my opinion is, that the vaccine, like every other eruptive fever, now and then proves the forerunner (it may be the cause or not) of a series of disordered processes, often manifested by chronic eruptions and glandular affections. I do not consider the vaccine fever to be as frequently followed by such disorders as either of the other eruptive fevers, nor that such disorders are equally severe in the former as in the latter case.	None whatever.	I do, very confidently.
34. **Barker**, T. A., M.D., (London), Physician to St. Thomas's Hospital.	My answer to the first part of this question is "No;" but I think the expression "almost absolute security" in the second part, is too strong.	No.	No.	Yes.
35. **Barker**, T. H., M.D., (Bedford).	I have not the slightest doubt. In this neighbourhood we have an excellent illustration of the good effects of strict attention to vaccination; inasmuch as, in one district, smallpox has repeatedly been imported but cannot spread to any extent; while in another district, where vaccination has been considerably neglected, smallpox, of a severe and even fatal form, has extensively prevailed.	Not the slightest.	Not the slightest.	Most certainly, I do. In any forthcoming legislative enactment, I would respectfully suggest, that a less complicated machinery be adopted for registering the cases of successful vaccination.
36. **Barlow**, G. H., M.D., (London), Physician to Guy's Hospital.	I believe that it confers permanent exemption upon a large majority, and that fatal smallpox in the successfully vaccinated is a most rare occurrence.	I have no valid ground for such an opinion, with the exceptions stated in answer to the next question.	I have no certain proof that it is ever the vehicle of such infection, though I have suspected it in the case of syphilis. No careful medical practitioner would, I think, ever knowingly vaccinate any one from a person in whom there existed any suspicion of syphilitic taint. As regards scrofula, I doubt its being communicated by *infection;* though, where such diathesis exists, the local irritation may lead to its developement in the part.	I do, most decidedly.
37. **Barnes**, T., M.D., F.R.S., (Carlisle), Founder and First Physician of Cumberland Infirmary.	I have no doubt whatever. I have seen a great number of vaccinated persons exposed to the infection of smallpox who escaped that fatal disease. I have seen several cases of modified smallpox after vaccination, and also some cases of smallpox after smallpox; but I do not remember any instance of death arising in a second attack of smallpox, or in smallpox after vaccination.	I have no reason to believe so. I have not seen the health of any one injured by vaccination. Vaccinated persons sometimes fall victims to infectious diseases, and to phthisis, which I think they would also do if they had not been vaccinated.	No. I have never witnessed such an occurrence.	I do most strongly recommend universal vaccination.

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38. **Bartlet, A. H.**, (Ipswich), Surgeon to the East Suffolk Hospital.	I have not.	No.	No.	I do.
39. **Bartolomé, M. de**, M.D., (Sheffield), Physician to the General Infirmary.	Not the slightest.	No.	No.	Most certainly, I do.
40. **Basham, W. R.**, (London), Physician to the Westminster Hospital.	I have not.	I do not think that persons vaccinated are more susceptible of other diseases.	(*a*) I do not think that lymph from a true Jennerian vesicle has ever conveyed syphilitic, scrofulous, or other morbid conditions to the person vaccinated. (*b*) I cannot conceive such an accident to happen to a *duly educated* medical practitioner.*	I do recommend (the health of the infant being favourable) that vaccination should be universally performed at the early periods of life; but I think that greater discrimination should be exercised in the appointment of persons skilled in vaccination.
41. **Bateson, J. T.**, (Lancaster), Surgeon to the Infirmary.	I have no doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox; and those who suffer from it, after being successfully vaccinated, have it in so mild a form, that death is very seldom the result. In my own practice of more than 30 years, I never lost a case of smallpox after successful vaccination.	In my judgment vaccination interferes in no other way with health than its protective power over smallpox.	I do not believe that lymph from a true Jennerian vesicle has any influence either in establishing or developing any other disease. I have no knowledge of any charge being substantiated against any "duly" educated medical practitioner of unintentional inoculation, instead of the proposed vaccination.	I do most sincerely hope that all means, both moral and legal, will be brought to bear in persuading and enforcing vaccination to be universally performed at early periods of life.
42. **Baylis, C. O.**, M.D., (Birkenhead), Surgeon to the Hospital.	None whatever.	I have not; except that I think I have noticed a slight activity given to latent diseases of the skin, principally of the squamous kind.	None.	I do.
43. **Bayly, J.**, (Great Yarmouth), Surgeon to the Royal Hospital.	No. I have been in practice 26 years. For 14 years I was Medical Officer of the Union, and have been one of the Medical Staff of the Hospital for the last ten years; I have also held the appointment of Registrar of Births and Deaths from the period in which the Registration Act came into operation; and I have never seen a true case of smallpox after successful vaccination. I have been told, in some cases of smallpox, that the patient had been vaccinated; but on inquiry, and from the absence of any cicatrix on the arms, I was satisfied that such cases had not been successfully performed. To the best of my recollection, I have never registered a death from smallpox in which the certificate of the "cause of death" stated "after "vaccination."	No. I have never found vaccinated children more susceptible of infantile diseases; nor do I believe, from observation, that they suffer from phthisis in a greater proportion than those who have not been vaccinated.	No. I have never seen a case which has led me even to suspect such a thing. I have seen many cases of cutaneous diseases in children which have been erroneously ascribed to vaccination, in consequence of its having been performed at the period of dentition.	Yes; for the reasons contained in the answer to question 3; and because I am satisfied that vaccination should be performed in the absence of any irritation caused by dentition. I am therefore of opinion, that from six weeks to three or four months is the best period in which to perform vaccination.

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* It has fallen under my observation in more than one instance, that great discredit and prejudice have been excited against vaccination, among the poor, by the failure of a operation in a number of successive cases. It may seem scarcely credible that a young medical practitioner should fail in so simple an operation; yet it is so, and from the ignorance of the proper method of performing it. I think, therefore, that all district vaccinators should, before appointment, be required to produce a certificate of having attended for some limited period the practice of vaccination under some experienced practitioner. The more uniform success of the operation would thus materially remove many of the prejudices among the poor. W.R.B.

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44. **Beales, R., M.D.,** (Congleton), Public Vaccinator for the Union.	The exemption that successful vaccination confers is almost positive. No case of smallpox after vaccination has been fatal in my practice.	No.	It is a prevalent idea in this neighbourhood, that different diseases are communicated by vaccination. But, after due observation, I believe there is no good ground for the opinion.	I do; believing it to b one of the greatest blessing conferred on mankind.
45. **Beatty, T. E., M.D.,** (Dublin), Professor of Midwifery to the Royal College of Surgeons, and Physician to the City of Dublin Hospital.	I have not the least doubt.	I have no reason to believe any such nonsense.	(*a*) I do not think such a thing possible. (*b*) I have never heard of such an occurrence.	Most certainly.
46. **Beck, Edwd., M.D.,** (Ipswich), Physician to the East Suffolk Hospital.	None whatever.	I have not.	I have not.	I do, strongly.
47. **Beever, W. W.,** Manchester), Surgeon to the Royal Infirmary.	No.	Certainly not, in my experience.	Never, to my knowledge.	I do.
48. **Begbie, J., M.D.,** (Edinburgh) President of the Royal College of Physicians, and Physician to the Queen in Scotland.	I have no doubt that it does confer such exemption.	I have no reason whatever for such belief, or suspicion.	I have no reason to believe, or suspect, that it has been such; or that such a circumstance has taken place.	I do, unhesitatingly.
49. **Bell, C.W., M.D.,** (Leamington), late Physician to the Manchester Royal Infirmary.	I have no doubt of it.	None whatever.	I am not prepared to assert this, nor the contrary; but I have known several cases of severe cutaneous disease, which appeared to have had no other origin than vaccination with impure virus. I have seen fatal smallpox inoculated from the cowpox vesicle of the seventh day, in a case where no smallpox appeared in the case from which the virus was taken, till three days after. The vesicle was imperfect on the eighth and ninth days.	Certainly a nation has right to demand that earl vaccination should be (wit very special exceptions) universal.
50. **Bellot, W.H.** (Stockport), Surgeon to the Stockport Infirmary, and Inspecting Surgeon of Factories.	I. do.	I have no reason to believe so.	I am not aware that any disease but the one intended can be given. I have known variola take place immediately after vaccination; but there is little doubt that the system was already infected. I have also known, when from some cause vaccination has been delayed, the child has been taken ill; which, had it been vaccinated, would have been attributed to the vaccination.	I specially recommend it but not earlier than at the age o two or three months. I would also repeat it at intervals of six or seven years.
51. **Bennett, J. R., M.D.,** (London), Physician to St. Thomas's Hospital.	None whatever.	I have not.	(*a*) I have suspected that syphilitic disease may be communicated by vaccination; and I would not willingly sanction vaccination from an unhealthy child, however perfect might be the Jennerian vesicle whence the lymph was derived. (*b*) If this means that, by mistaking a vesicle or pustule of some other disease for a vaccine vesicle, that other disease has been transmitted instead of cowpox, I answer *No.*	Most undoubtedly and ur hesitatingly.

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52. Bennett, T.H., M.D., (Edinburgh) Professor of the Institutes of Medicine, and of Clinical Medicine in the University.	None whatever.	No none.	No; none.	Most assuredly.
53. Benning, H., (Barnard Castle).	I have no doubt but that vaccinacion lessens both the number and severity of suffering in those attacked by smallpox; but it is not absolutely a security against death by that disease.	I have not seen any reason to suppose that vaccination predisposes those vaccinated to any other disease, or injuriously affects their health.	I have always been particular in taking vaccine lymph from the most healthy children, and therefore cannot answer this question; not having seen syphilitic or scrofulous disease brought into action by vaccination, I cannot say what may have occurred in the hands of other practitioners.	I do.
54. Bent, Thos., M.D., (Derby), Consulting Physician to the General Infirmary.	I have no doubt that vaccination confers exemption from smallpox, in the great majority of cases; and where it fails to secure exemption, it renders the attacks of smallpox much milder.	I think the notion preposterous and absurd.	I have no belief in such consequences resulting from vaccine inoculation.	I certainly do so recommend.
55. Bernard, R.M., (Clifton), Surgeon to the Bristol Royal Infirmary.	I have no doubt.	No.	I have not seen it in my practice. I do not think that it would ever occur, if due and proper means were taken to vaccinate.	Yes.
56. Bernard, J. F., M.D., (Bristol), Physician to the Infirmary.	None whatever.	Where proper precautions, as to the sources from whence lymph is derived, are taken, I see no danger of any disadvantage to the health, or of increased liability to any disease whatever.	From a true Jennerian vesicle lymph taken at a proper period will not (according to my belief) convey any other constitutional infection than its own. That unintentional inoculation with other disease has occurred by the hands of the duly educated medical practitioner I do not doubt; it would not be so were such duly educated man always as careful as he should be.	I do so recommend.
57. Bickersteth, R., F. R. C. S., (Liverpool), Consulting Surgeon to the Royal Infirmary).	None.	No.	(a) Yes. (b) No.	Yes.
58. Bird, G. G., M.D. (Swansea), Physician to the Infirmary.	I have no doubt upon this subject. Indeed, there is no subject upon which I feel a stronger conviction of certainty. I have never known a death, in my practice, from smallpox occurring after successful vaccination.	I have no reason so to believe, or suspect; but I well know that attacks of smallpox frequently do, more or less, permanently injure constitutions assailed thereby.	I have no facts to warrant such conclusion. May I venture to say, I almost invariably vaccinated directly from the vesicle; carefully selected the subject, and, then and there, called the attention of parents to the fact that I had selected a healthy subject. But, of course, it is obvious that unbusinesslike carelessness, wilful or culpable neglect, or ignorant meddlesomeness, may without difficulty, in this or any other matter, convert a great blessing into a very different thing, and do infinite mischief.	I have no hesitation whatever in affirming that such is my entire belief and conviction To believe otherwise, on the true evidence, I think impossible; or, at least absurd.

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59. **Birkett, John,** (London), Surgeon to Guy's Hospital.	I have none whatever.	None.	My experience affords no such example.	Certainly.
60. **Blacklock, A.,** (Dumfries), late Surgeon Royal Navy.	After upwards of forty years experience, I can safely say that I have no doubt whatever on the subject.	I have not.	No.	I do, and always have done.
61. **Blaker, H.M.,** (Brighton), Surgeon to Sussex County Hospital.	I believe that a very large proportion of those persons on whom successful vaccination has been practised become exempt from attack of smallpox, and those who are attacked with the malady, generally have it in so slight a form, that death seldom ensues.	Though vaccinated persons are certainly rendered less susceptible to smallpox, they do not, in my opinion, become more susceptible to any other infective disease, nor is their general health in any way influenced by it.	Lymph, from a true Jennerian vesicle, I have never known become the vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person. A duly educated medical practitioner, if he has any doubt as to the nature of the pustule, would not take lymph and vaccinate from it.	Most certainly.
62. **Blythman, R. O.,** (Swinton, Rotherham).	No doubt whatever. For the last fifteen years I have not witnessed a single case of smallpox after vaccination.	I do not.	Certainly not; as far as my experience goes. I have always been very particular in selecting my lymph.	My own desire would be, to have all children, if in good health, and free from eruptive disease, vaccinated from one month after birth to ten or twelve weeks old.
63. **Boulton, B.J., M.D.,** (Horncastle).	None whatever.	Certainly not.	(*a*) No. Nor have I any reason to believe that a true "Jennerian vesicle" can, by possibility, run its course in conjunction with any other "constitutional infection" or virus. (*b*) In 30 years, I have never known or heard of unintentional inoculation of any other disease in place of cowpox.	Yes; and I think the early age recommended by the present Vaccination Act most desirable.
64. **Bourne, W., M.D.,** (North Shields).	I consider one successful vaccination modifies smallpox during the whole period of life, and that, repeated at intervals of a few years, it gives, to say the least, a very great exemption from its attacks. I had about 13 years ago an opportunity of seeing this tested, on a large scale, in Prussia.	On the contrary, I believe that the commonly called "dregs" of smallpox had these injurious effects.	No. But the period at which vaccination is performed, during the teething and formative processes, is one peculiarly prone to favour this as a vulgar error.	Most certainly.
65. **Boutflower, John,** (Manchester), Surgeon to the Salford Dispensary and Hospital.	No.	No.	(*a*) No. (*b*) No.	Yes; at two or three months old. I have known a child a fortnight old die from smallpox taken from its mother. I have two or three times seen erysipelas of the arm and shoulder follow vaccination, and once prove fatal. Also sloughing of the pustule.
66. **Bowman, W., F.R.S.,** (London), Surgeon to the Royal Ophthalmic Hospital, and to King's College Hospital.	None.	None.	None.	Most certainly I do.
67. **Bradshaw, J. T.,** (Huddersfield), Surgeon to the Infirmary.	I have no doubt whatever on the subject.	I do not consider them any more susceptible of any other disease; or that their health, in future, is affected by it.	(*a*) No. (*b*) I never met with an instance of.	Yes.

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68. Bramwell, J. B., M.D., (North Shields).	No.	No.	I have seen eruptions break out after vaccination, which I have been inclined to attribute to the lymph used having been taken from an unhealthy subject. When from a perfectly healthy subject, never.	Decidedly.
69. Branson, T., M.D., (Sheffield), Physician to the Infirmary.	I have no doubt whatever on the subject.	I do not believe that vaccinated persons are rendered more susceptible of other diseases; nor have I met with any evidence tending to show that health is disadvantageously affected by vaccination.	I have no evidence to offer in support of these suggestions; and firmly believe lymph, from a true Jennerian vesicle, would produce its like, and not any other disease. I have not met with any instance of a mistake being made in the hands of a duly educated medical practitioner.	I do, as a general r recommend that vaccinat should be universally p formed at early periods of l
70. Brett, T., M.D., (Boston, Lincolnshire).	I am of firm belief that genuine vaccination is a panacea against smallpox attacks; and if in solitary cases, and in certain constitutions, smallpox attacks do occur, we may never look for death after true vaccination.	I do not believe that vaccination renders any one susceptible of any other infective disease, or of phthisis, or that their health is in any way prejudicially affected.	(*a*) I do not. (*b*) Certainly not.	I do consider that v cination should be perform at early periods of life, from six to twelve month age; but at earlier peri do *not* approve of it, an reasons which may be e explained.
71. Bright, Richd., M.D., D.C.L., F.R.S., (London), Consulting Physician to Guy's Hospital.	I have not the slightest doubt.	I have never seen any case which could lead me to suspect it.	(*a*) I have never seen any such case. (*b*) I consider it very improbable that this would ever happen in the hands of any educated medical man.	I certainly do, most str
72. Brinton, Wm., M.D., (London), Physician to the Royal Free Hospital.	No.	No.	No. (A negative which, I am aware, almost implies that I believe constitutional syphilis *not* to be infectious.)	Yes.
73. Brodie, Sir B. C., Bart., (London), Sergeant Surgeon to the Queen.	I believe that vaccination confers an exemption from the smallpox to a very great extent; and that in those cases in which it is followed by smallpox, the latter is almost invariably of a much milder character, and attended with very little danger to life.	I have no reason to believe that vaccination renders the individual more susceptible of other infectious diseases, or in any way affects the general health disadvantageously. Smallpox, scarlet fever, measles, or any other disease that tends to lower the vital powers, may render the patient the subject afterwards of what are called scrofulous affections. Vaccination does not operate in the same manner, simply because, as it produces no constitutional disturbance, there is no consequent debility.	I have no reason to believe that vaccination has ever been the means of introducing syphilis, or scrofula, or any other constitutional disease into the system. I have never known an instance of unintentional inoculation with some other disease (instead of the proposed vaccination) having occurred in the hands of a duly educated medical practitioner.	I certainly think it rable that vaccination s (as a general rule) be per at an early period of life.
74. Brooke, Chas., M.A., F.R.S., (London), Surgeon to the Westminster Hospital.	None whatever*.	None.	(*a*) I believe the transmission of scrofula, syphilis, or any other constitutional disease through the medium of true vaccine virus, to be physically impossible. (*b*) I know of no facts on this subject, but it is impossible to assign a limit to human carelessness.	Most certainly.

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* A curious fact, illustrative of the prophylactic value of vaccination, occurred within my observation many years ago. Variola occurred in one of the elder of four chi youngest of whom was under a twelvemonth, and the eldest about ten years; none of whom had been vaccinated. The other three were immediately vaccinated with fres In the youngest, the appearance and development of the vaccine vesicles was retarded three or four days, but eventually they were well developed. Simultaneously, ho feeble variolous eruption made its appearance, but the pustules were never developed. In the next child the vaccine vesicles were more retarded, but well developed, and a variolous eruption was partially developed, but the pustules were all small. In the eldest, as there was no appearance of rising on the seventh day, re-vaccinated; two or t afterwards, however, the first set of vaccine vesicles made their appearance, and simultaneously a pretty free variolous eruption; and the two ran their course so eq could not distinguish the vaccine pustules, except by their exact quadrangular arrangement, thus ∴. But the case was not severe, and was unattended by any bad symp these three cases, infected by each disease simultaneously, and under precisely similar circumstances, the severity of the variola appears to have been exactly in the reve the development of the vaccine vesicles. C. B.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
75. **Brookes**, W. P. A., (Cheltenham), Surgeon to the Hospital.	I have not the slightest doubt.	No.	No	Yes; most strongly.
76. **Brown**, Jos., M.D., (Sunderland), Senior Physician to the Infirmary.	I have no doubt that successful vaccination confers on persons subject to its influence, a very large exemption from attacks of smallpox; and, although not absolute, yet very great security against death by that disease.	I have no reason to believe, or suspect, that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infectious diseases, or of phthisis; or that their health is in any other way disadvantageously affected.	I have no reason to believe, or suspect that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection, to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner.	I recommend early vaccination, excepting for special reasons in individual cases; and this rule, of early vaccination, I have invariably observed in my own numerous family of children and grandchildren; and hitherto with perfect success.
77. **Brown**, R., (Preston), formerly Senior Surgeon to the Dispensary.	I believe vaccination an almost perfect prophylactic against smallpox, when rightly performed.	No; but I think if the rules and precautions, as to the condition and health of the child at the time of vaccination, so much insisted upon by Dr. Jenner, and Dr. Willan were better observed, the advantages of the operation would be greater.	No.	Yes.
78. **Browne**, H., M.D., (Manchester), Physician to the Royal Infirmary.	None whatever. Very few patients enter the smallpox wards of the Fever Hospital, in Manchester, who have, on one or other arm, the evidence of successful vaccination. And those who do, and have confluent pustules even, as a rule, have no secondary or suppurative fever, and are sure to recover. I have demonstrated this fact to the students, four times; and seen one marked instance in private practice.	None whatever, though my attention has been repeatedly called to the subject, by the statements of patients.	No. Syphilis is a specific poison, and may be propagated by inoculation, but could not be mistaken by an educated man. I do not consider scrofula to be a specific disease, or capable of propagation by inoculation. All deteriorations of the general health share alike in the production of scrofula. But vaccination exerts no depressing influence on the vital powers.	Most certainly.
79. **Buchanan**, C., M.D.	Vaccination does not prevent smallpox; but renders the disease more manageable, and prevents fatal tendency.	I believe that it does not render the system more liable to infectious diseases, when the person vaccinated is in a proper state of health.	I never knew any.	I recommend early vaccination.
80. **Buchanan**, G., M.D., (Glasgow).	None.	No.	(*a*) No. (*b*) I have known a person inoculated with genuine vaccine lymph become affected with smallpox, on the eighth day; this was in the Fever Hospital, where some smallpox cases were lying in an adjoining ward. On close examination, pits of a previous attack of smallpox were discovered on the body. The patient died of confluent form of the disease.	I do.
1. **Budd**, G., M.D., F.R.S., (London), Censor of the College of Physicians, Physician to King's College Hospital.	No. The protection afforded by successful vaccination seems to be perfect, for some years. The protective influence seems then, in some instances, to work out, to a certain extent, and to be capable of renewal by a fresh vaccination.	No.	I have met with no instance from which such inferences could fairly be drawn.	Yes.

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82. **Budd**, H. W., (Worcester), Surgeon to the Infirmary.	I have no doubt on these points.	Certainly not.	No.	I fully recommend early vaccination in early life.
83. **Budd**, J., M.D., (Exeter), Physician to the Devon and Exeter Hospital, &c.	I have no doubt it confers large exemption from smallpox, and that death from smallpox is afterwards very rare.	No reason whatever.	I have never known it to have been the vehicle of any specific infection; but I have certainly often observed that children, after vaccination, have been very subject to ordinary vesicular and pustular eruptions on the skin.	I certainly do.
84. **Bullar**, J., M.D., (Southampton), Physician to the South Hants Infirmary.	None whatever. These two points appear to me to be completely established, by as large a number of facts as have ever been collected to elucidate any principles in the history or treatment of disease.	No. I have never had any reason to suspect this, in my own experience, and the improbability of any injury by vaccination, to the general health of the community, is shown by statistics, which prove that the mean duration of life is slowly increasing, as well as by the fact of the enormous increase of the Anglo-Saxon family, since the time of Jenner, which is the best proof of the vigorous constitution of the individuals composing it.	No.	Yes.
85. **Bullar**, W., M.D., (Southampton), Surgeon to the South Hants Infirmary.	None.	None.	None.	Yes.
86. **Bullen**, G., F.R.C.S., (Ipswich), Senior Surgeon to East Suffolk Hospital.	As far as my experience goes, I have no doubt whatever on this point.	Certainly not.	(*a*) No. (*b*) I cannot believe in the possibility of such a blunder occurring in the hands of a duly educated medical man.	Most certainly.
87. **Bulley**, F. A., (Reading), Surgeon to the Royal Berks Hospital and County Prison.	I have no doubt whatever on this point.	I have never known an instance where the health has appeared to have been disadvantageously affected by vaccination.	(*a*) In my personal experience I have never known any constitutional affection follow the operation of vaccination, nor have I ever heard of such instances from regularly educated medical men. (*b*) I never heard of a regularly educated practitioner having intruded infectious matter into the system.	I do.
88. **Bullock, Henry**, (London).	No.	No.	No.	Yes.
89. **Burleigh**, A., (Bristol), Surgeon Accoucheur to the Dispensary.	I have not.	I have not.	I have not.	I do.

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90. **Burrows, George**, M.D., F.R.S. (London), Physician to St. Bartholomew's Hospital.	I have every reason to believe that this question may be answered unreservedly in the affirmative.	I have no reason to believe that successfully vaccinated persons become more susceptible of other infectious diseases, or of phthisis, but I am not sure that the general health is not sometimes disadvantageously affected by the vaccine virus.	I have no reason to believe or suspect that the true vaccine lymph has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; but I do fear and suspect that unintentional inoculation with some other matter than the true vaccine lymph has occurred in the hands of legally qualified medical practitioners.	I do most strongly recommend that skilful vaccination should be universally performed at early periods of life, except in some few excepted persons.
91. **Busk, George**, F.R.S., (London), Surgeon to the Hospital Ship Dreadnought, and Hunterian Professor at the Royal College of Surgeons.	None whatever.	I know of no reason, nor can I imagine any, of the slightest weight for such belief or suspicion; but, on the contrary, it is notorious that smallpox, where not fatal, is not unfrequently followed by scrofulous and other affections.	I have never witnessed any circumstance which could lead to such a belief or suspicion. I should think that no qualified medical practitioner in possession of his senses could commit such an error, nor, in fact, am I acquainted with any disease which could be so conveyed, having the most distant resemblance to cowpox.	Certainly.
92. **Byerley, J.**, (Seacombe), Honorary Surgeon Wallasey Ladies' Charity.	No.	No.	No.	Yes.
93. **Cam, Thomas**, F.R.C.S., (Hereford), Surgeon to the General Infirmary.	Not the least.	Nothing has ever occurred in my practice, to lead me to suspect that such could be the case.	None whatever. Besides, every properly educated practitioner will refuse to take vaccine lymph where the constitution is tainted by any disease.	I should recommend that the operation be always performed before teething.
94. **Cammack, Thomas**, M.D.,(Spalding, Lincolnshire), Physician to the Dispensary.	I have no doubt. My experience of vaccination has extended through nearly fifty years. It has been a very large experience, and left no shadow of doubt.	Certainly not. I know that scrofulous disease, and that phthisis, were and are more frequent after smallpox than after vaccination. I do not recollect an instance in which subsequent disease could be fairly traced to it.	I have no reason to believe anything of the kind. Lymph from a true Jennerian vesicle is not a vehicle of other disease. "A duly educated medical practitioner" would of course select the lymph from a genuine vesicle, and a healthy subject.	I undoubtedly and unhesitatingly recommend its being universally performed at an early period of life. I have practised it invariably in my own children, and nearest connexions; submitting them a long time afterwards, when opportunity served, to the test of inoculation for the smallpox without effect.
95. **Cammack, T. A.**, (Boston, Lincolnshire).	I am quite sure that vaccination, when successful, is an almost certain security from attacks of smallpox, and that when smallpox does occur in a vaccinated person, it is in a milder form than it would very probably have been.	I do not believe that vaccinated persons have their health in any way disadvantageously affected.	The lymph from a true vaccine vesicle has *never* in my experience been the vehicle of any constitutional affection except its own; and I believe that in all such alleged cases, it will be found that the matter has not been purely vaccine.	The only way in which vaccination can be rendered of really practicable service is, that it should be properly performed in the first six months of infant life.
96. **Canney, George**, M.D., (Bishop Auckland, Durham), Certifying Surgeon under the Factory Act.	I have not any doubt whatever.	I have no reason to believe or suspect so.	Doubtful as to all, except syphilis.	Generally, I recommend that vaccination should be performed before the commencement of teething, that is, between the ages of six and thirteen weeks.
97. **Cape, Lawson**, M.D., (London), Physician General to the Lying-in Hospital, York-road, Lambeth.	Having practised vaccination extensively for 23 years, I am quite satisfied that it does.	Certainly not. The idea is absurd.	Not any.	Yes.

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98. CARLYON, C., M.D., (Truro), Consulting Physician Royal Cornwall Infirmary.	From observation extended over more than half a century, I can confidently declare it to be my belief, that vaccination performed with due attention to the very few rules enjoined by Dr. Jenner, affords as great protection against the smallpox as variolous inoculation, and is not itself an infectious disease. Vaccination may be relied upon whenever the lymph has been transferred from the vesicle of a healthy subject, on the eighth day from that of vaccination, to the arm of a healthy subject, care being taken that the lancet used be quite clean. It is possible that there may be concealed peculiarities in the constitution of the recipient, which may interfere with success; but variolous inoculation was still more obnoxious to this remark, inasmuch as its virulence is proportionally more calculated to stir up any morbid constitutional propensity.*	—	—	—
99. CARTER, JOHN, (Birmingham), Senior Resident Surgeon to the General Dispensary.	No.	No.	No.	Yes.
100. CARY, W. H., (Woodford, Essex), late Surgeon to the Infant Orphan Asylum, Wanstead.	Certainly, none. *Almost* absolute security; not remembering more than two cases in my practice, during the last thirty-one years.	I have no reason for believing so.	I never knew, or suspected, such a circumstance.	Yes.
101. CEELY, R., F.R.C.S., (Aylesbury), Surgeon to the Infirmary, and the County Gaol.	I have no doubt whatever.	I have no reason to believe or suspect any such thing.	Although I have heard of such events, I have never witnessed anything of the kind in my own practice of more than 35 years. (*See* Supplement, p. 125.)	Most certainly I do, for many reasons. I am a decided advocate for vaccination, except for special reasons in individual cases, before the period of dentition. At that early period children in general are in better health, the skin better disposed to receive and to yield healthy lymph than during the period of dentition; and at the same time the vaccination is far less liable to accident and interruption, to say nothing of the risk *in large towns* of smallpox infection from postponement.

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* The defect in the regulations of the Poor Law Commissioners (as I stated to them some years ago, through and at the request of the Truro Board of Guardians,) mainly consisted in their not requiring vaccination to be performed from *arm to arm*, on the eighth day; and on not further requiring that some experienced physician, or surgeon, should be appointed (at a fee of one or two guineas, according to circumstances, for each visit to the station,) to certify as to each successful case. Whereas all now depends on the word of the inoculator himself. I have always maintained, that, with these precautions, two or three years at the utmost would suffice to eradicate the smallpox in this country. I pointed out, and am ready to do so again, how easily arrangements might be made for carrying out these views in all the Poor Law Districts; and not a single objection was made, but to the additional expense, which would in fact have resulted in the greatest possible economy. Fifty years ago, I twice assisted, at an interval of some years, in vaccinating gratuitously every pauper child in Truro. C.C

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102. **Chadwick, Charles**, M.D., (Leeds), Senior Physician to the Fever Hospital, &c.	I have none.	None whatever.	I cannot doubt that lymph from a proper vesicle will, in all cases, produce a similar vesicle, with all its attendant advantages; due care being taken as to the constitutional health of the child into whose system the lymph is introduced. I cannot believe that with due care the occurrence referred to in the latter part of the question could arise.	I do.
103. **Chaldecott, William**, (Dorking, Surrey).	None whatever.	No.	No.	I do.
104. **Challacombe, John P.**, (Bristol), Surgeon to the Lying-in Institute and Dispensary.	No doubt whatever.	No.	I am not prepared to say.	I do.
105. **Chalmers, D.**, M.D., (Liverpool), Honorary Surgeon to the Northern Hospital.	I am sure that it does.	Decidedly not.	No.	Assuredly.
106. **Chambers T.**, M.D., (London), Physician to St. Mary's Hospital.	I believe it confers a very large exemption from attacks of smallpox, but I think the last clause too strongly expressed. I have seen one case of death from smallpox after vaccination (of which the marks were visible on the corpse), and one case of bare escape from death.	None.	I have no evidence on this subject.	Certainly.
107. **Chomel**, M.D., (Paris), Professor of Clinical Medicine to the Faculty, Member of the Academy, Officer of the Legion of Honor.	On ne peut douter que les personnes vaccinées et chez lesquelles le vaccin a parcouru régulièrement ses périodes, ne soient pour le plus grand nombre à l'abri de la petite-vérole; celles qui en petite proportion en sont atteintes ont en général une variole très-bénigne, à laquelle, à raison de cette benignité, on a donné le nom particulier de varioloïde; mais par exception très rare cette variole après vaccine peut être très grave, et même mortelle, comme peut l'être aussi la variole qui attaque pour la seconde fois un même individu.	Je regarde comme denuées de tout fondement les assertions d'après lesquelles les individus vaccinés seraient plus disposés que les autres à contracter la fièvre typhoïde et les maladies contagieuses, comme à être atteints de scrofules et de phthisis pulmonaire.	Je ne pense pas que la pustule vaccinale puisse contenir outre le liquide qui lui est propre le germe ou le principe générateur d'une autre maladie comme la syphilis; à plus forte raison ne saurais-je admettre que la scrofule, qui n'a rien de contagieux ni de transmissible par inoculation, puisse être transmise de cette façon.	Je fais des vœux pour que la législation rende la vaccination autant que possible obligatoire. J'en fais également pour que certain temps après une première vaccination, dix ou douze ans par exemple, une révaccination ait lieu là où l'on peut l'exiger, dans les écoles et les collèges par exemple; attendu qu'il est hors de doute aujourd'hui qu'il est une certaine proportion d'individus chez lesquels après un certain laps de temps l'aptitude à contracter la variole se reproduit; que cette seconde variole, ordinairement très bénigne, est quelquefois grave, et même mortelle; et qu'en outre ces varioles sécondaires conservent le virus variolique qu'on doit chercher à éteindre; et encore que les sujets non vaccinés qui se trouvent en contact avec les individus atteints de ses varioles bénignes (varioloïdes) sont pris de variole primitive pour eux, avec toutes les chances de confluence, et par conséquence d'extrême péril, et de toutes les mauvaises éventualités que la variole amène avec elle et laisse après elle. C'est un thème que j'ai soutenu depuis vingt ans dans mes leçons cliniques à l'Hôtel Dieu, et auprès des hommes d'état avec lesquels j'ai été en contact; mais jusqu'ici sans succès. Je souhaite qu'il soit mieux accueilli en Angleterre.

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108. Chowne, W.D., M.D., (London), Physician to the Charing Cross Hospital.	I have not any doubt.	No.	(a) No. (b) In the early days of vaccination, Yes.	Yes.
109. Christison, R., M.D., (Edinburgh).	No doubt whatever. I have seen numberless cases of variola and varioloid after vaccination, but not a single case fatal.	No reason whatever.	I have no reason to believe that either the one or the other has ever occurred within my observation.	Certainly.
110. Churchill, F., M.D., (Dublin), Vice-President of the King and Queen's College of Physicians in Ireland, &c.	I have no doubt that it does. No death from smallpox after vaccination has come under my notice.	No.	(a) No. (b) I have never witnessed such a case.	Certainly.
111. Clark, Sir James, Bart., M.D., (London), Physician in Ordinary to the Queen and Prince Albert.	I have no doubt, if vaccination be repeated at intervals, several times between infancy and maturity. This I consider necessary.	I see no reason for such suspicion.	I see no reason to believe the occurrence of either circumstance.	Except for some special exceptional reasons, I always recommend vaccination about the fourth month of infancy, before the irritation of teething begins, and to be repeated at intervals of about seven years, or sooner if smallpox should occur in the vicinity.
112. Clark, Henry, F.R.C.S., (Bristol), Surgeon to the Infirmary.	None whatever.	No.	No.	I do so.
113. Clark, F., le Gros, (London), Surgeon to St. Thomas's Hospital.	I have no doubt.	I have no reason for so believing.	(a) I am in possession of no data to guide me in answering this question: my opinion would be mere surmise. (b) I never heard of such an instance.	I do.
114. Clarke, W. B., (Whitehaven, Cumberland), Surgeon to the Infirmary.	None whatever.	Having been upwards of twenty years in practice, and, during a great part of this time, having paid special attention personally to the cases in my practice that have been vaccinated, I can truly say that I never saw, nor had reason to suspect, that persons who had been vaccinated had been rendered more susceptible, either of any other infective disease, or of phthisis, or that their health had, in any other way, been disadvantageously affected thereby.	I do not believe, and I have never had any reason to doubt my belief, that lymph, from a true Jennerian vesicle can ever be the medium of infecting a healthy vaccinated person, either with syphilis, scrofula, or other constitutional disease; although I admit the possibility, and perhaps not infrequency, of the developments of scrofula, marasmus, and some cachectic forms of skin disease in previously susceptible subjects after vaccination; just as these affections will develop themselves in such constitutions after other forms of eruptive diseases. That a duly educated medical practitioner should mistake any other form of vesicle for the true Jennerian one I cannot for a moment entertain, and therefore cannot suppose that he can unintentionally inoculate a patient with any other disease instead of the proposed vaccination. I have never known an instance.	I do.

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115. **Clifton, Nath.**, (London).	None whatever.	I have no suspicion that either other infective disease or phthisis can be thereby produced; or, that their health can, in any other way, be disadvantageously affected.	I have no reason to believe or suspect that syphilitic or other disease has been so communicated; nor is it likely that an educated practitioner could inoculate any other disease unintentionally.	Certainly.
116. **Coleman, Edward Hayling**, (Wolverhampton), Senior Surgeon to South Staffordshire Hospital.	I have no doubt, after an experience of more than 40 years.	I have never observed any susceptibility, or any disadvantage to their general health.	I have never known an occurrence of the kind, or that any educated man has unintentionally inoculated with other disease.	I consider the earlier periods best for vaccination.
117. **Coleman, Henry**, (Dover), Surgeon to the Hospital.	No.	No.	No.	Yes.
118. **Collins, Fred.**, M.D.,(Wanstead, Essex), late Surgeon to the Infant Orphan Asylum, Wanstead.	No.	No.	No.	Yes.
119. **Commission** for Public Vaccination in the Department of the Rhone. Communicated by **M. Roy**, M.D., (Lyons), formerly Physician to the Hôtel Dieu.	Les individus vaccinés sont généralement à l'abri de la petite vérole; et s'ils contractent cette dernière maladie elle est toujours favorablement modifiée par la vaccine antérieure et [les malades] n'y succombent que très exceptionnellement.	Il est faux que l'exemption de la variole par la vaccine soit la cause des fièvres dites typhoïdes, ou toute autre.	Le virus vaccin pris avec soin, non melangé de sang, ne donne jamais lieu à une autre maladie, syphilis, scrofule, teigne, &c. Si une maladie semblable se déclare chez un individu récemment vacciné, c'est qu'il y était prédisposé, et que le trouble apporté dans l'économie par le travail de l'inoculation n'a été que cause occasionelle.	Enfin, la vaccination doit être universelle. L'époque de la vaccination pourra seule être rétardie suivant quelques indications que le médecin seul peut apprécier.
120. **Combe, J. S.**, M.D., (Edinburgh).	None whatever. Nearly absolute.	No.	No.	Yes
121. **Complin, E. T.**, (London).	I have had great opportunities of observing the results of vaccination, from having had for some years, with the late Mr. Barnett, one of the Government vaccine stations when vaccination was in few hands. We for many years vaccinated 600 persons annually, and the result of very extensive observation convinces me that, in a *very large majority* of persons, it does exempt them from attacks of smallpox; but there are some persons, and even some families, who still remain susceptible of smallpox, but almost invariably in a very mild form. I have seen many such cases, but none fatal, and only two or three severe. I have often vaccinated children when one or two of the family lay dead of smallpox, the parents having been prejudiced against vaccination. It always prevented it, except in one case where the father died of confluent smallpox. I vaccinated his infant, and the smallpock and vaccine pustules rose simultaneously, the former of a very mild character.	I have not observed any of the results mentioned in this query to follow vaccination. I believe many delicate persons survive under vaccination who would have perished under inoculation.	(*a*) I do not believe that lymph from a *genuine vesicle* in a strumous child would be prejudicial, but I have always selected it of course from apparently healthy children; still it is more than probable that some of them have had strumous disease subsequently. Syphilis, or any such poison, I consider might be communicated. (*b*) I have known matter taken from a re-vaccinated subject (having formerly had the regular cowpock) cause an irregular and unpleasant and troublesome form of cutaneous eruption. Nor would I, under any circumstances, use such matter; as my experience tells me that (*as a rule*) a person having once had regular cowpock is not susceptible of the genuine disease again. But although you use good lymph you get a spurious pustule rising in three or four days, instead of eight or ten, putting on a different appearance, itching much, often causing inflammation of the absorbent glands and vessels, and much constitutional disturbance; in fact, acting as a morbid poison; consequently, I object to re-vaccination.*	I do.

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* On one occasion, my friend, Mr. T. Warner, of Cirencester, sent me some lymph taken by him from a cow. I sent some to the Vaccine Board, and used the remainder Their observation, as well as mine, was, that it produced a pustule exactly similar, and not finer than that arising from lymph that had passed through probably hundreds of perons.
E.T.C.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
122. CONQUEST, J. T., M.D., (London), Physician to the London Orphan Asylum, &c.	I have no doubt on this point; and am convinced that, when smallpox occurs after vaccination, it is, in the majority of cases, so modified as to be a comparatively harmless disease.	No.	No.	Yes.
123. COOK, ROBERT, (Gainsbro', Lincolnshire).	I have not the least doubt. I have not seen a case of death from mitigated smallpox (varioloid disease).	Certainly not. I have vaccinated upwards of 10,000, during 50 years practice, and have not seen any ill consequences from it.	Nothing of the kind has occurred in my practice. I have lived long enough to see a majority of those I have vaccinated grow up to man and womanhood in robust health. I do not believe scrofula is communicable by inoculation.	Most certainly.
124. COOKE, WM., (London), Surgeon to the Eagle Insurance Company.	No doubt whatever.	I have no reason to believe, or even to suspect, that the evils here mentioned have been ascribable to vaccination; on the contrary, I believe that, escaping the more violent disease of smallpox, latent tendencies to disease are not so frequently brought into activity.	My belief is that, from a genuine Jennerian vesicle the lymph produces cowpox only. I have never seen a case in which I could suspect that syphilitic, or scrofulous, or other infection had been imparted with the lymph; nor can I suppose that a duly educated practitioner would so mistake the true vesicle as unintentionally to inoculate with some other disease.	Yes.
125. COOKWORTHY, J. C., M.D., (Plymouth), Senior Physician to the Dispensary.	None whatever; for, in the course of 44 years practice, I have never seen a death from smallpox after vaccination, although I have heard of such.	No; and I should deem such a suspicion to be groundless and absurd.	No; but if it be possible, with vaccine lymph, to communicate syphilitic, scrofulous, or other constitutional disease, the inoculation of variolous matter must be liable to the same contingency. I do not believe that any duly educated medical man can so mistake the true Jennerian vesicle as to inoculate from any other disease instead of it.	Yes: because, knowing the vaccine disease to be only smallpox deprived of its virulence, and otherwise marvellously modified, and relying on its affording almost an absolute security from death by the latter form of the disease, I should recommend vaccination to be performed early; i.e. within three or four months after birth; an age at which I should expect smallpox, in a great majority of cases, to prove fatal.
126. COOPER, GEO., F.R.C.S., (Brentford), Consulting Surgeon to the Middlesex Lunatic Asylum.	None whatever.	No.	No. If taken at right time, never.	Yes.
127. COOPER, SIR HENRY, M.D., (Hull), Physician to the General Infirmary, &c.	I have no doubt whatever on these points.	I have seen nothing to lead me to suspect any such results.	I have some doubts on the point. I have frequently seen obstinate skin diseases follow vaccination, and, in a few cases, scrofula and syphilis: these instances have not been sufficiently numerous to establish the relation of cause and effect.	Most strongly.
128. COOPER, JOHN, F.R.C.S., (Liverpool), Consulting Surgeon to the Infirmary, &c.	I entertain no doubt on this subject; and do believe that vaccination confers the security against the smallpox generally ascribed to it.	After 44 years practice, extensively in midwifery, as well as in other branches of the profession, and having vaccinated some thousands of children, I have never seen or observed anything to lead me to believe, or even to suspect, any of the evil consequences of vaccination here referred to.	I have not seen a single case that created, in my mind, such a belief or suspicion, nor have I known any instance of the kind last mentioned.	It is my decided opinion, that vaccination should be generally performed, or universally, within the first three months of infancy; unless some peculiarity contraindicate, or render the operation hazardous.

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129. Copeman, E., M.D., (Norwich), Physician to the Norfolk and Norwich Hospital, of the Jenny Lind Infirmary, &c.	It is, to my mind, extraordinary that any one should entertain a doubt upon the subject.	I have never been able to trace any prejudicial effect upon the general health from vaccination, and do not believe that vaccinated persons become more susceptible of other diseases.	I believe that good lymph, from a true Jennerian vesicle, never does, and never can, produce any other disease than that which properly belongs to it. But, whether or not there be any truth in the popular notion that vaccination sometimes causes eruptions, I would never vaccinate a healthy child from one who was suffering from any other disease.	I recommend that vaccination be always practised at early periods of life, and tested once by re-vaccination, after an interval of three or four years.
130. Cornish, C. H., F.R.C.S., (Taunton), Surgeon to the Hospital.	I have no doubt.	Certainly not. In strumous and grossly fed children, I have occasionally seen vaccination followed by an eruptive disease of a temporary character.	Certainly not.	I do. My opinions are founded from an experience of about ten years as House Apothecary to the Taunton and Somerset Hospital, where, prior to the passing of the Vaccination Act, I superintended the vaccination of upwards of 300 children annually; also as a medical officer of the Taunton Poor Law Union for twenty years.
131. Cowan, John B., M.D., (Glasgow), Surgeon to the Western Public Dispensary.	None.	No.	No.	Yes.
132. Crampton, Sir Philip, Bart., M.D., (Dublin), Surgeon General to the Forces, and Surgeon in Ordinary to the Queen in Ireland, &c.	I have no doubts as to the benefits conferred by successful vaccination.	I have no reason to believe that vaccinated persons, on being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected.	I have no reason to believe that lymph from a true Jennerian vesicle has ever been the vehicle of any other disease.	I do recommend that vaccination should be invariably performed at early periods of life, except there be special reasons in individual cases.
133. Craven, Robt. M., (Hull).	I have no doubt.	None at all.	I have no ground for believing that any such consequences have been produced.	I am of opinion that, if possible, vaccination should be universally performed at early periods of life.
34. Croker, C. P., M.D., (Dublin), Physician to Swift's Hospital, and to the Institution for Diseases of Children.	None.	Certainly not.	Certainly not.	Yes.
35. Crompton, D. W., (Birmingham), Senior Surgeon to the General Hospital.	I have not the least doubt that vaccination, properly and sufficiently performed, gives to the receiver of the disease as great protection against smallpox as inoculation for smallpox itself did, when it was employed in childhood, formerly.	I have never had the slightest reason to believe or suspect that such was the case.	I have never seen any other disease than true genuine cowpox arise from proper vaccination, nor has it ever occurred to me to know that any other disease has ever been introduced into the system by supposed vaccine matter.	I do. But I was of opinion, and I am so still, that at three months was too limited a period to restrict the performance of vaccination by law, as was appointed by the first Vaccination Bill.
6. Curling, T. B., (London), Surgeon to the London Hospital, and to the Jews Hospital.	None whatever.	None.	None.	Yes.

———	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
137. CUSACK, J. W., M.D., (Dublin), Professor of Surgery in Dublin University, &c. &c. &c.	I have not any doubt.	No.	In giving an answer in the negative, I assume that not only the source of the supply of infection is pure; but that the person to be inoculated is free from disease, local or constitutional.	Certainly.
138. CUTLER, EDWD., (London), Surgeon to St. George's, and Consulting Surgeon to the Lock Hospital.	No.	No.	No.	Yes.
139. DALTON, WM., F.R.C.S., (Cheltenham), Surgeon to the Dispensary for Diseases of Women and Children, and to the Lying-in Institution.	From extensive experience in this locality, during the last twenty-six years, I am confident that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox and almost absolute death from that disease. In the Winchcomb Union, when smallpox had shown itself in any particular locality, I have frequently and completely arrested its progress by promptly vaccinating all young children, and re-vaccinating others that had not been vaccinated for seven or ten years.	None whatever.	Certainly not.	I am of opinion that vaccination should not be performed, excepting for special reasons, under three or four months after the birth of the child. I have, however, vaccinated a child when one day old, without more than the average amount of constitutional disturbance. The inducement in this case was that a female servant was lying dead of confluent smallpox at a near neighbour's house, and that there were other cases of malignant smallpox in the locality. The vaccinated infant did well, and none of the numerous family were affected with smallpox, all having been vaccinated.
140. DASHWOOD, CHAS. B., (Great Yarmouth).	I do not consider persons who are properly vaccinated so liable to attacks of smallpox. They are not absolutely secure against death from smallpox after vaccination, but I consider the disease is mitigated by vaccination.	I do not.	(a) None; only temporarily. (b) I cannot answer for other medical men.	I consider, if children are vaccinated within one year or later, no special reasons preventing, is sufficiently early.
141. DAVIES, THOMAS, M.D., (Chester), Physician to the General Infirmary, &c.	I have not any doubt of it.	I have not any reason to suspect such consequences, nor do I think the health of those who have been vaccinated suffers from vaccination.	I never met with such results from vaccination, nor do I consider it likely they will arise under ordinary circumstances.	I do.
142. DAVIES, JOHN, M.D., (Hertford), Physician to the County Gaol, the General Infirmary, &c.	No doubt whatever. I wonder anybody should.	Not any reason to believe such to be the case.	(a) No. (b) It is very possible that such might occur through inadvertence, or neglect. I do not know of any such a case.	Most assuredly.
143. DAVIS, G. M. MILLETT, F. R. C. S., (Liverpool), Surgeon to the Northern Hospital.	I have no doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, but I apprehend this security is limited, and I found my opinion on what I have observed as the results of secondary vaccination, which I think is almost as important as primary.	I have not; neither do I consider that health is in any other way disadvantageously affected, where proper care is taken as to the source from whence the lymph is derived; but as to this, I apprehend sufficient caution is not always adhered to.	I think so; and for the reason that I have seen mischief arise from vaccination from improper sources.	Certainly; and I wish here to state my opinion, founded on observation, that in all cases secondary vaccination ought to be had recourse to: I have been very much impressed with this conviction from the observation of several years. I do not think that successful vaccination protects a person beyond a limited period.

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144. **Davis, Theodore,** (Clevedon, near Bristol), Surgeon to the Dispensary.	I have no doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox: in the great majority of instances conferring absolute exemption, in others such a mitigation as to deprive the disease of its virulence, and dangerous tendencies. I found my opinion upon an experience of more than 30 years, during a great portion of which I was very actively engaged in gratuitous and other vaccination. I am not aware that any patient vaccinated by me has died of smallpox. Not one in a hundred has had smallpox at all. And, in the few cases in which it has occurred, the attacks have been mild in form, and short in duration.	I have no reason to believe or suspect that vaccinated persons become more susceptible of any other disease whatever; such a supposition indeed appears to me to be so utterly preposterous as to be an absurdity.	I have never seen (and my observation extends over some thousand cases) the slightest reason to suspect that any other disease has been communicated with vaccination; nor do I think that there is the slightest danger of such communication, in the hands of a competent vaccinator; which, of course, every well educated medical practitioner must be. Children suffering from eruptions have occasionally been shown to me, and I have been told the eruptions were the effect of vaccination; but, on sifting the cases, I have invariably found that there has not been the slightest foundation for the opinion.	My experience of the good effects of vaccination induces me, earnestly, to recommend the universal adoption of vaccination before the commencement of teething, except in a few cases, in which there might be special reasons for delay.
45. **Dendy, W. C.,** (London), Senior Surgeon to the Royal Infirmary for Children.	I believe *complete* vaccination is prophylactic in a very large proportion almost invariably for a certain period after its development: in nearly every case it modifies the *degree* of variola, controlling secondary fever, and converting into *variolella* that which might otherwise have been confluent, malignant, or fatal, but the invasion of which, in consequence of very *extreme susceptibility,* it has not *prevented.*	I believe the affirmation of this query an error; indeed it may be often the reverse, as convalescence from one specific disorder constantly predisposes the system to infection by another. Nor do I believe variola can, in any view or mode, be deemed a preventive of phthisis, except on the principle of severe or perilous local irritation, as a counteraction.	The true vaccine vesicle I believe to be *purely* vaccine, and cannot or ought not to be mistaken. The insertion of its lymph cannot contaminate a healthy system with other specific disease, as struma or syphilis. Impure pus from udder sores, &c. may produce various local and systemic morbid results, and these, by reducing constitutional power, may render the system prone to the development of latent germs *already existing.*	I am not aware of any reason, except that of existing disease, for the neglect of vaccination in early life. The criterion of success and prognosis of protection, even in unhealthy children, may be decided by local appearance, and the degree of erethysm.
146. **Denton, Jos.,** (*Leicester*), Senior Honorary Surgeon to the General Dispensary, and Surgeon to the Union.	I have not; and I rarely meet with a case of smallpox after vaccination. In those cases in which it has occurred the disease has assumed a mild form. I have not met with a case of death from smallpox after vaccination.	I have not.	I have no reason to suspect, or believe, such a circumstance.	I do.
147. **Dermond, L. E.,** B. A., (Liverpool), Honorary Surgeon to the Northern Dispensary.	I have no doubt whatever that successful vaccination confers comparative exemption, and greatly modifies smallpox.	I do not think the health or constitution at all deteriorated by being spared such a terrible disease.	(*a*) No. (*b*) Not that I know of.	I do; and here I should wish to call the attention of the Government to the difficulty that often exists of procuring good and pure lymph, and to the frequency of failure in vaccination. I should suggest the establishment of Vaccine Farms, whence fresh lymph could be supplied to all the district vaccinators from time to time.
148. **Dodsworth, B.,** M.R.C.S., (York), Senior Surgeon to the Dispensary.	I have no doubt that such is the case.	I believe that, where the operation is properly and successfully performed, there is no reason to apprehend such unfavourable results.	I have not, in my own experience, observed such to be the case.	Yes.

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149. DOUGLAS, A. HALLIDAY, M.D., (Edinburgh), late Senior Physician to the Royal Infirmary.	I do not believe that vaccination affords any exemption from attacks of smallpox; but I am satisfied that it modifies the severity of the disease, and lessens the mortality in a most important degree.	I have not.	I have not.	I do.
150. DOUGLAS, J., (Bradford), Certifying Surgeon under the Factory Act.	None whatever.	No.	Twenty-five years observation and experience lead me to conclude that the greatest care ought to be taken in the selection of lymph from a perfect and true Jennerian vesicle, occurring in a sound constitution.	Yes.
151. DOWNS, GEO., F.R.C.S., (Stockport), Surgeon to the Infirmary.	Not the slightest doubt. I can only call to mind two fatal cases of smallpox after vaccination, during thirty years of hospital and private practice.	I do not believe that properly performed vaccination can, in any way, be prejudicial to the health of any persons subjected to its influence.	I do not believe in the coexistence of syphilis in a true Jennerian vesicle; nor have I ever known syphilis conveyed through such a medium. As to scrofula, &c., I am of a like opinion. The use of purulent lymph, in faulty constitutions, has sometimes given rise to a troublesome erythematous inflammation. Eczematous rashes are not traceable to properly performed vaccination.	At any period before cutting the first teeth; *i.e.*, from the third to the sixth month.
152. DUFFIN, E. W., M.D., (London), Surgeon to the Church of England and Scottish Union Insurance Companies.	I have no doubt whatever on this question.	No.	No. I do not believe the Jennerian vesicle could become so contaminated as to convey any other disease; or, if it did become so contaminated, I imagine its general character would undergo some change, and arrest the attention of the practitioner, who would not, in that case, take lymph from it.	Yes.
153. DUKE, ALLEN, M.D., (Chichester), Surgeon to the Infirmary.	Yes.	No.	No.	Yes.
154. DUKE, WILLIAM, M.D., (Hastings), Surgeon to the Dispensary.	No; on the contrary, I have the greatest possible confidence in vaccination, in spite of some few exceptional arguments or facts.	Certainly not.	No.	Certainly.
155. DUMVILLE, A. W., F.R.C.S., (Manchester), Senior Dispensing Surgeon to the Royal Infirmary.	I entertain no doubt upon this question.	My belief is, that vaccination does not increase the susceptibility of other diseases.	I have not seen any such cases as those included in the question.	I do, decidedly.
156. DUNCAN, P. M., (Colchester), Physician to Essex and Colchester Hospital, &c.	None whatever.	No.	Certainly not.	Yes.

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157. Dunn, Robert, F.R.C.S., (London), Surgeon to the Law Writers Provident Institution.	None whatever.	None whatever.	(a) I have none, from an infant child, but, from an older child, in which there was evidence of strumous disease or general cachexy, I would *not* vaccinate, nor from a child whose parents were phthisical, or affected with scrofulous disease. (b) I believe not.	My own practice has been to vaccinate at the third month. I have rarely done so earlier than this, excepting under special circumstances.
158. Dunne, John, M.D., (Great Yarmouth), Physician to the Hospital.	I have not the slightest doubt.	I do not believe that vaccinated persons are rendered more susceptible of diseases of any kind, or that their health is in any degree disadvantageously affected.	I have no reason to believe anything of the kind, or that pure lymph has ever been the vehicle of conveying syphilis, or any scrofulous disease, into the constitution.	It is my decided opinion, after over 30 years practice, that every child should be vaccinated at the earlier period of life—from one month to six weeks; and that vaccination, in the hands of educated medical men, is a decided blessing to humanity, for the discovery of which we can never be too thankful.
159. Dunsmure, James, M.D., (Edinburgh).	None.	None.	None.	Yes.
160. Duplex, G., (London).	I have no doubt but that such is the fact.	I have no reason to believe that vaccination can produce any injurious influence upon health; and inasmuch as vaccina is a modification of smallpox, I should judge *à priori* that it would not influence the production or non-production of phthisis, or in any way affect the susceptibility of the system to other diseases.	(a) I have had no experience of any facts which could lead me to suspect or infer that syphilis or scrofula has been engendered by the production of vaccina. And, arguing physiologically, I should assume that true vaccine lymph could not communicate any other form of disease than its own speciality. (b) I believe that suppurative lymph has been occasionally used in error, and much disappointment has ensued in consequence.	I have a very strong feeling in favour of vaccination, and think it ought to be universally performed. I think however that the susceptibility of infants to its infection is not to be depended upon before the fourth month; and in all cases a second vaccination should be performed about the seventh or eighth year of the child.
161. Durrant, C. M., M.D., (Ipswich), Physician to East Suffolk and Ipswich Hospital.	No.	No.	No.	Yes.
162. Dwyer, Henry L., M.A., (Dublin), Physician to Dispensary for Diseases of Children, Pitt Street.	I have not.	Certainly not.	I have not.	Most strenuously, I do.
163. Dyer, Wm. T., (London), Medical Attendant to the Royal Masonic Institution for Boys.	From ample experience, I believe that vaccination does in a very great degree protect persons from attacks of smallpox, and that it confers almost absolute security against death by that disease.	I have no reason to believe anything of the kind.	Certainly not.	I would certainly recommend that vaccination should be performed at early periods of life.
164. Dymock, Archibald, M.D., (Louth, Lincolnshire), Physician to the Dispensary.	I have not the slightest doubt whatever upon the subject.	None, rather the reverse. The immunity from an attack of the natural smallpox, saving the system the inevitable impoverishment of vital power therefrom arising, and thus rendering a delicate constitution more capable of resisting other infective disease and phthisis, the health is in no way disadvantageously affected by vaccination.	Never, in my experience. The true Jennerian vesicle, being in itself specific, cannot possibly be the medium of transmitting a second specific virus. Unintentional inoculation ought never to occur in the hands of a duly educated medical practitioner.	Most certainly.

	I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
165. EDDISON, BOOTH, F.R.C.S., (Nottingham), Surgeon to the Hospital.	I have no doubt that it does.	I have no reason to believe anything of the kind.	I have not any reason to believe either of those.	I do so recommend it. [These answers are based upon an experience extending from 1822; viz. 1st, for 5 years as resident apprentice at Nottingham Hospital, where gratuitous vaccination was performed for any person who applied; 2d, for 5 years as resident surgeon of the said hospital; and 3d, for 22 years of general practice, in which time I have vaccinated about 1,100 children].
166. ELKINGTON, FRANCIS, M.D., (Birmingham), Lecturer on Diseases of Children at Sydenham College.	No.	Not any.	Certainly not.	Yes.
167. ELLIOTSON, JOHN, M.D., (London), formerly Physician to St. Thomas's Hospital and University College Hospital.	I should not say "almost absolute security."	No.	No.	Yes.
168. EMBLETON, DENNIS, M.D., (Newcastle-on-Tyne), Physician to the Infirmary.	I feel no doubt that successful vaccination with good matter does these things.	No; not any.	No, I have not.	Yes, I do.
169. ERICHSEN, J. E., F.R.C.S., (London), Professor of Surgery to University College Hospital.	I have no doubt that if vaccination is properly performed, it affords almost complete exemption from attacks of smallpox for many years, and that if this disease be subsequently contracted, it will be in a mitigated form.	No.	(*a*) I do not believe that any *constitutional* disease can be communicated through the medium of vaccine lymph. (*b*) I do not believe it possible that an educated medical practitioner could confound the true vaccine pock with any other pustule.	I would (except under some very special individual circumstance) recommend that vaccination be *imperative* before the expiration of the third month after birth; and I would recommend its repetition about the period of puberty.
170. EVANS, G. F., M.D., (Birmingham), Physician to the General Hospital.	I have not.	I have not.	I have not.	I do.
171. EVANS, R. D. J., (Hertford), Medical Officer, Christ's Hospital. (*See* Supplement p. 147.)	I cannot but entertain a confident opinion in the protective influence of vaccination. I believe it affords very general exemption from smallpox, and security from death by that disease.	I have no ground to believe that persons are more susceptible of infective diseases, or of phthisis, or that their health is in any way prejudiced by vaccination.	I cannot believe, or suspect, that the evils specified have occurred under the circumstances named.	I consider it of practical importance to recommend vaccination at an early period of life, except in particular cases and for special reasons.
172. EVES, AUGUSTUS, F.R.C.S., (Cheltenham), Senior Surgeon to the General Hospital.	No; certainly not.	No; certainly not.	(*a*) Certainly not, in my own practice. (*b*) No.	Yes, certainly; if it be wished to ensure protection from smallpox.
173. FALCONER, R. WILBRAHAM, M. D., (Bath), Physician to the United Hospital, and to the Institution for Idiot Children.	No doubt whatever.	No reason to believe so.	(*a*) I have no reason to believe that such has ever been the case. (*b*) I have some reason to believe that this has sometimes occurred.	I do; most certainly.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
174. **Farr, Wm.**, M.D., F.R.S., (London), First Superintendent in the General Register Office.	I have no doubt whatever on this subject.	I have no reason to believe that vaccinated persons are more subject to any other infective disease, or to phthisis, than persons who are unvaccinated.	I cannot believe that lymph from such a vesicle would induce any of the diseases named; nor do I think it likely that a duly educated medical practitioner could unintentionally inoculate his patient with any disease.	I do.
175. **Farre, Arthur**, M.D., (London), Physician for Diseases of Children, King's College Hospital.	I have no doubt that it produces both these results.	The only unfavourable results that I have ever seen attributable to vaccination are the inflammatory conditions of the arm, in every degree, which occasionally follow vaccination, and the occurrence of various impetiginous eruptions. I have no doubt that both these are occasional results of vaccination; nor have I been able always to connect them with faulty virus, or a bad method of operating, though in many cases probably these were causes.	(*a*) I have never met with an instance. (*b*) No. But some are not sufficiently careful, and do not hesitate to take lymph from a vesicle too far advanced, so that the matter inoculated is not true lymph.	I advise that, except under special circumstances, every child should be vaccinated when from two to four months old. And at the same time I protest against a practice, which I fear is more common than is supposed, of vaccinating infants of *one week* old. This is done in some workhouses to ensure the vaccination of the infant before the mother quits the house. I have seen three cases in the last twelve months of terrible phlegmonous inflammation so produced, and utterly destroying the health, if not the life of the infant. I beg earnestly to call your attention to this as a subject for inquiry.
176. **Farre, Fred. J.**, M.D., (London), Physician to Saint Bartholomew's Hospital.	None whatever, that the exemption is very large, and the security against death by smallpox as great, or very nearly as great, as that conferred by a previous attack of smallpox itself, which security however is not, *even in the latter case*, absolute.	I have no reason to think so.	I cannot say. I certainly would not vaccinate from a syphilitic child, and therefore I suppose I *suspect* the possibility of infection being thus communicated, though I know of no *facts* either for or against it.	Certainly at an early period of life, except under special circumstances.
177. **Favell, W. F.**, (Sheffield).	No doubt whatever.	No.	Lymph from a Jennerian vesicle I believe to be quite incapable of conveying constitutional infection; and the unintentional inoculation mentioned I think impossible.	Yes.
178. **Fenwick, J.**, M.D., (Thirsk), Physician to Ripon Dispensary.	None whatever.	No.	I have not known or heard of such a case on any reliable authority.	I do.
179. **Fergus, W.**, M.D., (Marlborough). (*See* Supplement, p. 147.)	I have no doubt that vaccination does confer a very large exemption from attacks of smallpox. And I believe that attacks of small pox occurring after vaccination are generally of a mild character.	I do not think that exemption from smallpox in any way renders a person more liable to other diseases.	I do not believe that vaccine lymph conveys or gives rise to any but its own specific affection nor do I think that erroneous inoculation is likely to occur in the hands of a duly educated medical practitioner.	I think that vaccination ought to be universally performed early in life (unless special circumstances existed to forbid its use); and I think that it would be beneficial to repeat the operation in more advanced childhood, as a means of ascertaining who were, and who were not protected, and giving a further chance to those who proved to be without protection. I do not think that a duly protected person ever takes smallpox; at the same time, I think that there are constitutions which no amount of vaccination will suffice to protect from smallpox.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
180. **Ferguson, Robt.**, (London), Physician to the Queen, and Consulting Physician to Kings College Hospital.	None whatever.*	I do not believe that the vaccinated are rendered more prone to any other infectious disease by that act. The contamination of the blood by the introduction of a poison into the system will often give rise to secondary disease; but examples of these are fewer and more trifling from the vaccine virus than from any other animal poison known to me.	I have never known such effects.	I consider it a *crime* not to urge vaccination,—a crime of omission.
181. **Fergusson, Wm.**, F.R.S., (London), Professor of Surgery in King's College.	None whatever.	No.	No.	Most strongly.
182. **Fife, George**, M.D., (Birmingham), Physician to the Queen's Hospital, &c.	Vaccination most undoubtedly affords a certain degree of protection against smallpox; such protection, however, is uncertain, both as to duration and extent. The disease, when occurring after vaccination, is generally mild; in fact, in an experience of 30 years, I have seen but one fatal case after vaccination.	I have not sufficient data to justify me in offering a decided opinion on this point.	I have never seen a decided case of such transmission; but I have frequently been consulted in the cases of children, who, previously to vaccination, had enjoyed good health, and subsequently suffered from obstinate skin disease.	Decidedly.
183. **Fife, Sir John**, F.R.C.S., (Newcastle-on-Tyne), Surgeon to the General Infirmary.	I have no doubt of the influence of vaccination in preventing, or at least vastly mitigating, smallpox.	None.	None.	I do.
184. **Finch, W. C.**, M.D., (Salisbury), Consulting Physician to the Salisbury Infirmary.	No.	No.	No.	Yes.
185. **Fincham, G.**, M.D., (London), Physician to the Westminster Hospital.	None.	Certainly not.	No.	Certainly.
186. **Firth, G. W. W.**, (Norwich), Surgeon to the North Hospital.	I have no doubt.	Not the least.	No.	Yes.
187. **Fleming, J. G.**, M.D., (Glasgow), Surgeon to the Royal Infirmary.	No.	No	(*a*) I have a suspicion that I have once seen syphilitic disease communicated in this way; but it is a very difficult point to ascertain with perfect accuracy. (*b*) No.	I do.

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* The town of Norwich, after a total exemption for about five years, became the seat of epidemic smallpox, in 1819, conveyed thither by a country girl travelling from Yorkshire. The following results are given on the authority of a well-known surgeon of that city, Mr. Cross.

Of those persons who had neither had smallpox nor cowpox, 3,000 caught the disease; of whom 530 (i.e. more than one-sixth) died. Of those who had been vaccinated, amour to about 10,000, about *two in one hundred* were affected by the smallpox contagion, but in a very mild form: and *only two died.* Compare, therefore, the mortality: one in six the unprotected; and one in five thousand for the protected.

Dr. Thomson of Edinburgh gave the history of epidemic smallpox in Edinburgh in 1819. He saw in all 836 cases. Of these 281 occurred in persons who had never had either the cowpox or the smallpox. The mortality in these was more than one in four. Seventy-one had had smallpox: of these two died. 484 had been vaccinated: of these only one died. Here, then, the mortality in the unprotected was 1 in 4; that of smallpox after smallpox was 1 in 35: that of smallpox after vaccination was 1 in 484. R.F.

———	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
188. FLETCHER, T. BELL, M.D., (Birmingham), Physician to the General Hospital and the Blue Coat School.	Not the slightest. I have seen very severe cases of modified smallpox, but never death from a modified case; and I have seen exemption from smallpox secured by vaccination where the disease existed in the house, in all human probability.	No.	No.	Most certainly I do.
189. FORBES, SIR JOHN, M.D., F.R.S., (London), Physician in Ordinary to Her Majesty's Household.	I have not the least doubt.	I have no reason to believe, nor do I believe, that vaccinated persons are more susceptible of any other disease, or that their health is injured.	No.	I most strongly recommend universal vaccination; except in certain cases, for special reasons.
190. FRASER, DR., (London), Physician to the London Hospital.	No doubt.	No reason.	(*a*) No reason. (*b*) No evidence.	I do.
191. FRERE, ROBERT TEMPLE, M.A., (London), Physician for Diseases of Children to the Middlesex Hospital.	I have no doubt.	I have no reason to suppose so.	I have no personal experience that leads me to such a conclusion.	I strongly recommend it.
192. FROSCH, LUDWIG, (Wittingau, Bohemia), Public Vaccinator. (*See* Supplement, p. 126.)	—	—	—	—
192A. FRY, FREDERICK, F.R.C.S., (Maidstone), Senior Surgeon to the West Kent Infirmary.	I have been in practice 26 years, and during that time have vaccinated many hundred patients; and I can honestly declare that I never remember a case of smallpox after. I have no doubt it is all but a positive security.*	If the child be vaccinated with virus taken from a healthy child, and the disease passes properly through its different stages, I do not believe that child to be made more susceptible of infectious diseases, or phthisis; neither do I believe its health can be disadvantageously affected.	All medical men think it their duty to vaccinate syphilitic or scrofulous children; but no one would presume to vaccinate other children from them. I cannot think any medical man has ever knowingly done so; consequently I hardly perceive how the question can be answered. I cannot remember any case of my own vaccination, where either syphilis, or scrofula, or any eruption has appeared to be transmitted.	I consider the best period for vaccination is from the tenth to the sixteenth week.
'93. FULLER, H. P., (London), Visiting Apothecary to St. George's Hospital.	I have no doubt on the subject, but am strongly of opinion that every child vaccinated should be after some years re-vaccinated, to ascertain whether the protective influence remains. I have known of fatal cases of smallpox after vaccination, and many very severe cases which have recovered.	I have not been able to trace any of these diseases to vaccination; but then, I make it a point to vaccinate from none but healthy children.	(*a*) No. (*b*) I cannot imagine that any well-educated medical man could make such a mistake.	As the result of my experience, I should say that vaccination should not take place until the child is at least three months old.
4. FURNER, EDMUND J., (Brighton), Senior Surgeon to Sussex County Hospital.	From my experience, I am satisfied that vaccination exempts persons to a very great extent from attacks of smallpox, and is almost an absolute security against death by that disease.	I do not believe that vaccinated persons become more susceptible of any disease whatever, or that their health is in any way disadvantageously affected.	(*a*) I do not believe that true vaccine lymph has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person. (*b*) Nor that a properly educated medical practitioner could ever unintentionally inoculate with some other disease, instead of the proposed vaccination.	I do.

A very striking case of its efficacy occurred to me about 15 months ago. The smallpox was prevalent about here, and a girl seven years old had it badly. I did not see her il the eruption had appeared three days. The case was confluent, and the child had a most narrow escape with her life. This girl was the youngest of seven children, and not been vaccinated. I had vaccinated the other six; they were all living at home: two of the sisters had slept in the same room, and one in the same bed, with her up to he e of my seeing her; neither of these (one of whom had been vaccinated nine, and the other eleven years) took it; nor any other of the family, F.F.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
195. **Gairdner, J., M.D.,** (Edinburgh), formerly President of Royal College of Surgeons, Edinburgh.	A very large exemption undoubtedly: "Almost absolute security against death" is too strong an expression.	None.	No. But we have never used, or seen used lymph, without due precaution.	Yes. But this recommendation must not be held to imply an approval of, or confidence in, any legislative measure for rendering vaccination compulsory.
196. **Garlick, J. P.,** F.R.C.S., (Leeds), late Senior Surgeon to the Dispensary.	Not the slightest.	No.	No.	Most decidedly.
197. **Gibney, W., M.D.,** (Cheltenham), Senior Physician to General Hospital.	I have no doubt at all on the matter.	They are not more susceptible to any other infective disease, or of phthisis; nor have I ever seen their health in any other way disadvantageously affected.	No.	Always to be performed in early life, and if effectual in the first instance I never recommend it to be performed again. If necessary to be performed again, (as many suppose,) professional men, who do not adopt it, would soon be swept off the face of the earth, from constant exposure to infection.
198. **Gillespie, J. D.,** M.D., (Edinburgh), Assistant Surgeon to the Royal Infirmary.	No.	No.	No.	Most decidedly.
199. **Gisborne, H. F.,** (Derby), Surgeon to the Derbyshire General Infirmary, &c.	I have no doubt of the fact, in both cases.	I do not believe vaccination can predispose to any disease.	(*a*) I do not believe it possible. (*b*) I do not credit any such supposition.	I do.
200. **Goddard, C.,** (Stroud), Surgeon to General Hospital and Dispensary.	None whatever.	Not at all.	Never.	I do.
201. **Gooch, W. H., M.D.,** (Canterbury), Physician to Kent and Canterbury Hospital.	None whatever.	None whatever.	No.	Most certainly.
202. **Goodfellow, S. J.,** M.D., (London), Assistant Physician and Lecturer on Medicine at the Middlesex Hospital; formerly and for ten years Resident Medical Officer to the London Fever Hospital.	None whatever: always supposing that vaccination has been *successfully* performed; and modifying the expression of its being an *almost absolute* security against death, into a *very great* security.	No, I have not. With regard to the assertion that vaccination merely substitutes for smallpox a higher mortality by typhus or typhoid, I am of opinion that there is no truth whatever in it, and that it is entirely unsupported by facts, or evidence of any kind.	From my own experience none whatever, and I am of opinion, judging from my own experience, that scrofulous infection is not likely to be imparted. With regard to syphilis, I am not in a position to give you a positive opinion.	I do recommend it, most strongly, and I think that the provisions with regard to it in the present Vaccination Act (16 & 17 Vict.), are unexceptionable.
203. **Goolden, R. H.,** M.D., (London), Physician to St. Thomas's Hospital.	No.	No.	I cannot quite answer this question by a negative, although for all practical purposes it would be sufficient. I have seen cases (I cannot say how many) in which healthy children after vaccination have become unhealthy, and this has occurred in different stations of life. Skin disease of an obstinate character has succeeded, mostly of a pustular form, and it is often attributed to an unhealthy source of vaccine lymph by the friends, but I believe without foundation, as the source was healthy, and did not produce the same effects in others. The *recipient* seems to originate the morbid action, and not the *source*, and to such recipient the smallpox would be fatal. If a river must be crossed in the dark, it is better to go over a bridge than to wade, although accidents have happened on bridges.	Most decidedly.

	I. Have you any doubt that successful vaccination confers on persons subject to its influence, a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
204. **Gore, R. T.**, (Bath).	None whatever.	None.	None.	I do. I am inclined to think that the period now fixed by law, viz. 3 months, is too early, and tends to increase the objections that many persons of all classes feel to the idea of vaccination being made compulsory.
205. **Grabham, John**, M.D., (London).	From observations during 40 years of the results of vaccination, in extensive parochial engagements and private practice, I am certain that successful vaccination confers large exemption from smallpox, and almost absolute security against death by it. I could illustrate the latter by cases of severe attacks of smallpox on vaccinated subjects cut short about the fifth day of eruption; and proving harmless as to the life of the mother, when complicated with childbirth.	I have no reason to believe—indeed, I disbelieve—that any new susceptibility of disease can be engendered by vaccination, or that health can be in any way damaged by it.	(a) I do not believe that good vaccine lymph has ever conveyed to the vaccinated person any syphilitic, scrofulous, or other infection. (b) I remember that (many years ago) no doubt by mistake, a practitioner conveyed smallpox to some children brought to him for vaccination.	As a general rule, it has been my practice to recommend that vaccination be performed on infants before that period when disturbance of health may be expected from dentition.
206. **Granger, F.**, M.B., (Exeter), Physician to the Hospital.	I have no doubt; and never knew a death occur from secondary smallpox after vaccination.	I do not believe that they are, or that the health is in consequence thereof disadvantageously affected.	(a) None. (b) I know of no such case.	Yes.
207. **Graves, R. W.**, (Gloucester), Honorary Surgeon to the Dispensary.	I do not think that there can be reasonable doubt on this matter. Successful vaccination is the only security we, at present, know of against attacks of smallpox, and is particularly valuable as security against death by this disease. Smallpox, such as it existed in former ages, is at present unknown to us. I believe this immunity is entirely owing to the protective influence of vaccination.	I have not, and I believe that there are not the slightest grounds for such an hypothesis. I am disposed to think that the very reverse is the case.	(a) I have not, nor do I believe that pure vaccine lymph can ever become the vehicle of such infection. (b) I am aware that such a popular delusion exists, but without foundation.	My own experience leads me to the conclusion that vaccination should generally be performed between the third and seventh months; after that time many of those diseases incidental to children interfere with its due performance.
208. **Green, Jos. Henry**, (London), D.C.L., F.R.S., Consulting Surgeon to St. Thomas's Hospital, past President of the College of Surgeons.	I cannot pretend to much practical experience on the subject of vaccination, but I have no doubt of the protective influence of vaccination; and I recollect a remarkable instance of the arrest of the contagion of smallpox (which had been introduced by inoculation, and was rapidly spreading in a country district,) by means of energetic vaccination.	Nothing has occurred in my experience to induce this belief.	I know of no fact that would countenance these views; and I apprehend that persons entertaining such opinions can be only those who are ignorant of the circumstances under which diseases are ordinarily propagated.	Believing that vaccination is protective, I consider that to withhold it would be to hazard wantonly the life of the child.
209. **Greenhalgh, R.**, M.D., (London), Surgeon Accoucheur to the Royal General Dispensary, St. Pancras, to the Percy Lying-in Charity.	None whatever.	No.	I have frequently heard statements to that effect, but no instance of the kind has ever come under my observation.	I most conscientiously should recommend its universal performance at early periods of life.
210. **Greenhill, W. A.**, M.D., (Hastings), Physician to the Infirmary.	I have no doubt of it.	I have no reason to believe it, or even to suspect it; but I think both these points deserve to be thoroughly investigated, for the satisfaction of those who hold a different opinion.	(a) Such a case had never been met with by any of the members present, but was not considered to be impossible. (b) The members were not aware of any such case.*	Yes.

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* I thought it would be more satisfactory to send you something like the collective opinion of the medical practitioners of this place, rather than simply my own. Accordingly, your Questions were read and discussed at the last Meeting of our Medical Society; and I believe my answers express very nearly the unanimous opinion of the members present though *the Society as a body* is not to be considered as responsible for them. W. A. G.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
211. **Greenhow, E. H.**, M.D.,(London), Lecturer on Public Health at St. Thomas's Hospital, and Physician to the Western General Dispensary.	None. I have never seen a case of smallpox prove fatal in a vaccinated subject.	(*See* Appendix, H.)	I am undecided upon this subject. Popular opinion is in favour of the occasional transmission of other diseases in vaccination. I believe a spurious, and therefore imperfectly protective, or even altogether inoperative, vaccination is not uncommon, and am disposed to attribute to this cause several very severe attacks of smallpox that I have seen in vaccinated subjects in very early life. I am, however, decidedly of opinion that the exercise of a proper care in the selection of subjects from whence the lymph is taken, added to a system of occasional inspection, for the purpose of ascertaining that the pustules possess the character of the true Jennerian vesicle, will effectually obviate any danger of propagating other constitutional diseases through vaccination.	I do. The best period, in my opinion, for the performance of vaccination, is between the sixth week and third month after birth.
212. **Greenhow, T. M.**, M.D., (Newcastle-on-Tyne), Consulting Surgeon to the Infirmary.	I have no doubt on the subject.	My experience has furnished no instances of any of these alternatives.	I have no reason to entertain any such suspicions.	I can scarcely imagine an instance in which it is not desirable to perform vaccination in early life.
213. **Gregory, Sam.**, F.R.C.S., (Sheffield), Surgeon to the General Infirmary.	I have no doubt.	I have not.	No.	Yes.
214. **Griffith, S.**, M.D., (London), Physician to the Surrey Dispensary, to the Royal Maternity Charity, &c.	Not the least doubt.	No; but I believe that formerly smallpox weeded the population of many delicate constitutioned persons. On this account, and from experience, I believe persons who have recovered from smallpox are good lives for insurance.	No. The idea has been caused through vaccinating children when out of health; an irregular form of eruption following, which always yields to treatment directed to previous constitutional tendency.	Yes. Re-vaccination I believe to be useless, except to test the effect of its previous use. Five or six per cent. will be found to be fully susceptible, from its previous insufficient performance.
215. **Griffith, W.**, F.R.C.S., (London), Surgeon Accoucheur to the Royal Maternity Charity.	I have none.	Decidedly not.	No.	Yes. (*See* Appendix, No. 1
216. **Guersant, R.**, M.D., (Paris), Surgeon to the Children's Hospital.	Je n'ai aucun doute sur la réalité de cette immunité.	Je pense que la vaccine diminue la susceptibilité de prendre la petite vérole—et qu'elle ne dispose pas en général à d'autres maladies.	Oui:—je crois qu'on peut inoculer la syphilis par la vaccine ou toute autre maladie contagieuse.	Oui:—il est avantageuse de pratiquer la vaccine vers la fin du premier mois, ou vers le second mois de la naissance.
217. **Gull, W. N.**, M.D., (London), Lecturer on the Practice of Medicine, at Guy's Hospital.	I have no doubt on this point.	I have no reason to believe they do, or that their health is in any way impaired.	No,—to both points of this query.	I am of opinion that vaccination should be performed at the early periods of life.
218. **Hall, W.**, (Lancaster), Surgeon to the Dispensary.	I have no doubt of the influence of effective vaccination in securing almost entire immunity from smallpox; and in my experience, where it has not entirely prevented, it has so modified the disease, that it has lessened its duration by from 2 to 4 days, and wholly removed all danger of death or even of disfigurement.	I have never seen a case that would lead me to suspect that vaccination, even in any way, injuriously affects the general health, or power of resisting infectious diseases.	I have never seen cause to think that genuine lymph can be the vehicle of other constitutional infection; but where the scrofulous or other constitutional taint already exists in the child, I believe that vaccination may cause the development of the hitherto latent disease; just as we sometimes see the case after measles, chickenpox, and scarlatina.	If efficient vaccination is an almost certain preventive of smallpox, I think it follows as a necessity, that the earlier the protecting influence is put in force the better; not only because the risk of smallpox is thus lessened, but in order that the entire success of the vaccination should not be interfered with by the varied irritations of teething.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
219. **Hamernik, Josef**, (Prague), M.D., formerly Professor of Clinical Medicine. (*See* Supplement p. 127).	—	—	—	—
220. **Hamilton, W. T.**, (Rock Ferry, Cheshire), Consulting Surgeon to Birkenhead Hospital and Dispensary.	Not the least; as I think it has been clearly and most satisfactorily proved by long observation.	I have not observed it; and therefore have no reason to believe it.	(*a*) I do not think it could. (*b*) I have heard of such a case, but account for it in this way; that the disease must have been lurking in the system, and became developed by the irritative fever following vaccination.	I think that between the second and third month after birth is the most favourable time for vaccination; and that it should be repeated in the course of 7 or 10 years.
221. **Hammond, C. C.**, (Ipswich), Surgeon to the East Suffolk Hospital.	No doubt whatever upon the subject. I have never seen a severe case of smallpox after successful vaccination.	I am not aware of any; but I have reason to believe that, where there is hereditary tendency to cutaneous disease, vaccination may, in such cases, act as an exciting cause, and bring into action what might otherwise have remained dormant.	Being a disease "sui generis," I am of opinion that no other disease would be introduced into the system by vaccination; but I think it quite possible for a latent cutaneous disease to be brought into action in some constitutions.	As a general rule, I prefer early vaccination, and prior to the irritation set up in the system by dentition.
222. **Harris, H. C.**, F.R.C.S., (London), Medical Officer to the Orphan Asylum, Haverstock Hill, Surgeon to the Boys Mission Home, (*See* Supplement, p. 149).	I have no doubt that the affirmative of this quære is the truth.	I have no reason to admit that vaccination contributes towards any other form of disease, or that it deranges future health.	(*a*) The affirmative of the first proposition is simply absurd. (*b*) To this second proposition I reply doubtfully; for some, qualified by law, practise with very little knowledge of the true vaccine vesicle.	Assuming due provisions for a skilful performance of vaccination by an experienced vaccinator, I would have every healthy child vaccinated before it is six months old. The best time is in the fourth month.
223. **Harrison, J.**, F.R.C.S., (Bristol), Senior Surgeon Royal Infirmary.	No. I have no doubt.	No.	No.	Yes.
224. **Hastings, Sir Charles**, M.D., (Worcester), Physician to Infirmary and Dispensary.	I have no doubt.	I have not.	If care be taken in selecting the parties from whom lymph is taken, I see no danger of any such occurrence.	I am decidedly of opinion that vaccination should generally be performed at an early period of life.
225. **Havers, J.**, F.R.C.S., (London).	None whatever. A very great security; I can hardly say "almost absolute."	No.	No.*	Yes.
226. **Hawkins, Fras.**, M.D., (London), Physician to the Middlesex Hospital.	I believe, that of persons who have been vaccinated, and in whom that process has passed through its regular stages, a large proportion are rendered completely and permanently insusceptible of smallpox; also, of those who subsequently to vaccination, as above described, have been attacked by smallpox, very few have had that disorder in a severe form, and very few indeed fatally.	I have no reason to suspect anything of the kind.	I have no reason to believe or suspect any such fact, or the occurrence of any such accident.	I recommend this course without hesitation.
227. **Hawkins, J. V.**, M.D., (Lynn), Physician to the West Norfolk and Lynn Hospital.	I am quite convinced of it.	Certainly not.	No.	Yes.
227A. **Hebra, Dr.** (Vienna).	(*See* Supplement, p. 134).	—	—	—

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* It not unfrequently happens that diseases are ascribed to vaccination which are due to other causes. The fact of such diseases occurring shortly after vaccination seeming to favour the *post hoc, propter hoc* conclusion. For example, on the 15th February 1845, I was requested to vaccinate the child of the housekeeper at No. 6, Carlton Gardens. Not having any vaccine matter by me, I put off the vaccination till the following Monday. On calling on that day, I declined to vaccinate, because I found the upper part of the child's arms and chest covered with eczema. Pneumonia came on, and the child died on the following Thursday. I considered this a lucky escape, as, had I vaccinated the child, nothing would have convinced the friends that it had not died of disease produced by vaccination. J.H.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
228. **Headland, Edw.**, (London), late President of the Medical Society of London.	None.	I have no grounds for adopting such an opinion; nor can I perceive why exhausting the susceptibility for one poison should create a susceptibility for another.	I have never found lymph from the "true Jennerian vesicle" producing any other effect than a repetition of itself, but I have met with infants, said to be vaccinated, who presented pustular crusts very different from the true vaccine crust.	I think it advisable that vaccination should be universally performed at early periods of life.
229. **Heaton, J. D., M.D.**, (Leeds), Physician to the General Infirmary.	Not any.	Not any.	(*a*) Not any. (*b*) Such mistake could not occur at the hands of any careful and well-informed practitioner; I am not aware of any such instance.	Yes.
230. **Hebra, Ferd., M.D.**, (Vienna), Professor on Skin Diseases, and Head of the Smallpox Division of the General Hospital; (*See* Supplement, p. [illegible])	—	—	—	—
230 a. **Heslop, T.P.**, (Birmingham), Physician to the Queen's Hospital.	No.	No.	No.	Yes; certainly.
231. **Hester, J. T., F. R. C. S.**, (Oxford), Senior Surgeon to the Radcliffe Infirmary.	No.	No.	No.	Yes.*
232. **Hewett, P., F.R.C.S.**, (London), Surgeon to St. George's Hospital.	No.	No.	No.	Yes.
233. **Hey, Richard**, (York), Senior Surgeon to County Hospital.	It does not admit of a doubt. I affirm this question as a matter of certainty.	I by no means think they do. I do not recollect more than one case in which there was reason to think the child had worse health after vaccination than before. I do not infer that in this instance vaccination was the cause.	No, to the whole of this question.	I do not. I think 3 months too early, and never vaccinate children so young myself. In fact I have not in any instance conformed to the Vaccination Act since it was passed, and I do not intend unless I am compelled to do it.
234. **Heygate, F. A., M.D., F.R.S.**, (Derby), Senior Physician to the Derbyshire General Infirmary.	I have not the least doubt, from long experience, that it confers all these benefits.	None whatever.	None whatever.	I do, most confidently.
235. **Hilton, J., F.R.C.S.**, (London), Surgeon to Guy's Hospital.	None.	None.	No.	Yes.
236. **Hingston, Chas., M.D.**, (Plymouth), Physician to the South Devon and East Cornwall Hospital.	None whatever.	I do not believe that vaccinated persons are more susceptible of disease of any kind, but a disturbance of the health has sometimes followed the process of vaccination, and has led to the development of constitutional disease.	I have never witnessed an instance to justify such a belief, or suspicion, except under the circumstances above referred to in the answer to query No. 2.	Most undoubtedly, I do.

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* I cannot be content to give my answers simply to the questions, but wish to express (having given much attention to the subject of vaccination) my confirmed conviction of its general efficacy; and my confidence that, were it universally practised smallpox would ultimately be got rid of altogether. In the year 1854, that disease raged most fearfully in this City; and we had many opportunities of testing the safety afforded by vaccination. I, among others, re-vaccinated a considerable number of persons. In general, the arm inflamed considerably on the following day, and assumed the appearance of a gnat-bite; but in the course of two or three days the inflammation subsided altogether. This corresponds in a great degree with what Dr. Jenner observed, when he inoculated with smallpox persons who had previously had the vaccine disease. But in about one case in eight or nine, a tolerably correct pustule rose. Instead however of going on to maturity, it generally died away about the sixth or seventh day. In these instances the patients would, I believe, have been susceptible of the influence of smallpox *in a modified form*. In a very few instances the disease ran its regular course; and had it not been instituted, I have little doubt but that the individuals would, if exposed to the contagion of smallpox, have had the disease in an unmitigated form.

In no case where irregular inflammation took place did smallpox supervene. One fatal case resulted, in my practice, after vaccination performed twenty years previously. In this case I re-vaccinated the individual, and no inflammation followed; it was neglected to be done again.

I was myself vaccinated fifty-six years ago, and have at various times been exposed to contagion in attending the worst cases of smallpox. I have repeatedly re-vaccinated myself. When I have done so, the arm has inflamed in about ten minutes, and assumed the appearance I before mentioned, with intolerable itching and irritation, continuing for two or three days. I have never seen any one's arm so generally inflamed as my own; and I believe that the more completely the system comes under the influence of vaccination, the more rapidly does the spurious inflammation spread through it.

I believe that the vaccine disease, as it is seen now, is not as perfect as it was formerly. I do not see such well-marked and fine pustules as I did forty years back; and it is my firm conviction that we ought from time to time to procure, if possible, fresh supplies from the cow. J.T.H.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence, a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
237. **Hingeston, J. A.**, (Brighton).	I have no doubt that successful vaccination confers almost absolute security against smallpox; but I believe that successful vaccination is not the rule. Impure or weak virus, carelessness in vaccinating, inattention to the course of the vaccination, conspire to render many cases nugatory.	I do not think, nor have I ever known vaccination to be the cause of other diseases in the person vaccinated. I think that, in persons predisposed, it has, like any other exciting cause, provoked the appearance of latent struma; but this is not the fault of genuine vaccine virus. An accidental wound would have done the same. The vesicle would cease to be Jennerian if alloyed with any other virus, it would not maturate properly.	I have seen eruptions, certainly of a doubtful character, follow vaccination; but the same virus has not produced the same eruption in other subjects. I have seen erysipelas of the whole of the arm from vaccination; but this is very rare. I never saw, nor can I suppose that, in the hands of an *educated* practitioner, "unintentional inoculation with some other disease" could possibly occur.	Cæteribus paribus, the earlier the better. I published my notions on vaccination in the Association Journal, 1853; and I predicted that Lord Littleton's Bill for *compulsory vaccination* would prove abortive, and so it has. The fact is, the question does not turn upon compulsion, the chief point is to secure genuine lymph and careful vaccinators. This can only be done by a Public Board, such as the National Vaccine Institution for securing genuine lymph; and by the compulsory education of medical pupils in the practice of vaccination: at present, it is not taught. I have not room to write down all I could say upon this most intricate, extensive, and interesting topic. It is more than a national—it is a universal truth, which has reached a crisis in its existence that tends to its extinction or its perfect revival—I believe, the latter.
238. **Hoar, W.**, (Maidstone), Surgeon to the West Kent Infirmary.	None.	Decidedly not.	No.	Most strongly.*
239. **Holland, Sir Henry**, M.D., F.R.S., (London), Physician in Ordinary to the Queen and Prince Albert.	No doubt whatever.	I have no reason to believe so.	Nothing in my experience has ever led me to suspect this.	I do recommend this.
240. **Holt, B.**, F.R.C.S. (London), Senior Surgeon to Westminster Hospital.	None whatever.	Certainly not.	I have never known such an instance.	I do.
241. **Hood, P.**, (London).	I entertain no doubt that such is the case.	I have never observed any ill effects to result from vaccination; and I do not believe they (the vaccinated) are rendered more susceptible to infectious diseases, or to phthisis.	I have no grounds for such belief.	I do. I think three months too early; I believe five months to be a better period.
242. **Horner, F.R.**, M.D., (Hull), Senior Physician General Infirmary and Dispensary.	None.	None whatever.	No.	Decidedly so.
243. **Hovell, D.**, F.R.C.S., Clapton), Surgeon to the London Orphan Asylum, Clapton. (*See* Supplement, p. 151).	No doubt; but, in my opinion, vaccination rather effects modification of smallpox than confers exemption; but, in order to be effectual, it ought to be repeated once or twice, at intervals of six or seven years.	None; provided that the patient from whom the lymph be taken is healthy, and free from eruption.	None. Especial care should, of course, be taken that no lymph is taken from a patient having syphilitic taint, which with proper care would never occur.	Yes.

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*I have always been of opinion that our Vaccination Acts have been defective, in not providing for the *due repetition* of vaccination after the lapse of a certain number of years. n my experience I have known cases where it has "taken" the second time (*i.e.*, where a vesicle more or less perfect has been produced) after intervals varying from eight to twenty ears. Take for an instance, my own case. I was duly vaccinated as an infant. No further attempt was made until I was fifteen; when, during my pupilage, I was in the habit f vaccinating myself two or three times a year. sometimes oftener. But it did not succeed the second time until I was nearly twenty, when the vesicle was tolerably perfect. nce since, when about thirty, a still less perfect vesicle was produced; but it was, to my mind, quite sufficient to show that the disease went through certain stages and affected e system. W.H.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
244. HOWELL, E., (Swansea), Physician to the Infirmary.	I have no doubt on the subject.	I have no reason whatever to think so.	I have no reason to believe it.	I recommend it most strongly.
245. HOWELL, J., (Wandsworth).	None whatever.	I have not.	No.	I do.
246. HOWELL, T. S., (Wandsworth), Honorary Surgeon to the Royal Freemasons' School for Female Children, Battersea. (*See* Supplement, p. 151).	None.	No.	No.	I do.
247. HOWITT, T., F.R.C.S., (Lancaster), Honorary Surgeon to the Infirmary.	I have no doubt. Speaking from 30 years experience, I am sure it secures a very large exemption from smallpox. I have never seen death occur from smallpox after vaccination.	Decidedly not.	None whatever.	Most certainly, yes.
248. HOWITT, W., (Preston), Senior Surgeon Dispensary.	No doubt whatever.	Certainly not.	No.	Certainly.
249. HUDSON, A., M.D., (Dublin), late Physician to the Navan Fever Hospital.	I have no doubt it confers an immunity, little inferior to that conferred by smallpox. Of second attacks, of which I have seen several instances, one of them (under my own care) was fatal.	I have not.	No. The only case in which I ever knew bad consequences to result from vaccination, was in the practice of an apothecary, who used lymph taken from a child affected with purpura. A sloughing sore followed the operation and I believe the case ended fatally.	I have not been in the habit of vaccinating at an earlier age than three months. I think that in very young infants, there is a greater risk of suppurative inflammation of the vesicle, and that many of the large scars we see upon the arm in after-life are thus caused. I may be wrong, but this is the opinion I have formed. With this reservation, I answer, yes.
250. HUGHES, E. T., M.D., (Mold, Flintshire), Surgeon to County Prison.	I have every reason to believe that successful vaccination exempts a very large proportion of persons subject to its influence from attacks of smallpox, with almost absolute security against death by that disease.	I have never entertained such an opinion, nor have I ever heard any sound reason for entertaining it.	My experience, during 25 years, has not furnished me with any such examples. Although I cannot but suppose that some such unfortunate cases have occurred, evidence in proof thereof should be both distinct and decisive before it is accepted; and even then, admitting their possibility, the argument afforded by them against vaccination can do little to depreciate the infinite good it has done.	I decidedly recommend that every healthy child should be vaccinated before it is four months old.
251. HUGHES, H. M., M. D., (London), Physician to Guy's Hospital.	I have none.	None.	This I should regard as questionable; and not having, for many years, had any practical experience in vaccination, am not in a position to answer the question definitely.	Certainly.
252. HUMBLE, THOMAS, M.D., (Newcastle-on-Tyne), Physician to the Northumberland and Durham Infirmary.	Not the slightest.	No.	No	I do.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
253. **Humphry, G. M., M.B., (Cambridge), Surgeon to Addenbrooke's Hospital.**	No doubt whatever.	There is sometimes a little fever attendant on the course of the cowpox, which, lowering the status of the child for a time, may render it susceptible of any of the diseases of childhood; and I believe I have seen some injury done in this way. But it very rarely happens; and bears no comparison with the vast amount of good resulting from this, the greatest boon ever conferred on the public, through the medium of the science of medicine.	I have never known anything of the kind.	Certainly.
254. **Hunt, Thos., F.R.C.S., (London), Surgeon to the Western Dispensary for Diseases of the Skin.**	No doubt whatever. I believe the security produced by due vaccination to be exactly equal to the security produced by previous smallpox inoculation.* While smallpox is the great slayer of mankind in Bengal (the mortality at Calcutta from this cause being every few years most awful), yet smallpox as a cause of death in Bombay is scarcely recognised at all. In Bengal there is a strong religious prejudice against vaccination among the natives, which leads to its entire neglect in large districts, and general neglect in others. In Bombay, a system of universal vaccination, almost perfect both in plan and execution, has nearly banished smallpox from the Presidency. I believe no returns have been received from the Presidency of Madras.	No reason whatever. As regards the relation of vaccination to the infantile skin diseases of chronic character, I can confidently say, after examining and recording the history of upwards of a thousand cases of skin disease in children (occurring at the Western Dispensary for Diseases of the Skin), that I find no evidence whatever that vaccination disposes the constitution to cutaneous diseases; these appearing, in fact, to attack indiscriminately the vaccinated and the unvaccinated. Of course, since the compulsory Vaccination Act has been in operation, we have had more cases of skin disease after vaccination than we formerly had, simply because children are now vaccinated at or before three months instead of six, eight, ten, or twelve months of age. Therefore, a cutaneous disease which breaks out after the third month, necessarily occurs *after* vaccination. Formerly, it might at that age have occurred *before* vaccination. The date of vaccination has made the disease a *sequence*, not a consequence, of vaccination. Mothers frequently entertain the belief that any disease of the skin occurring after vaccination is caused by it; but I do not remember a single instance in which any reasonable evidence of such connexion could be produced.	No such case has ever come under my own observation, though a report (not wholly credible) has reached me, as to an attack of severe or fatal erysipelas, resulting from the use of a foul lancet, in mistake, for the purpose of vaccination.	I do.

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* Of 283 persons of all ages, applying for relief at the Dispensary for Diseases of the Skin, during the first few months after it was opened · (1.) There had been vaccinated 201;) Had had the smallpox, never having been vaccinated, 52; (3.) Neither vaccinated, nor had taken the smallpox, 10; (4.) Could give no certain account of the matter, 20.
Of the 201 who were reported as vaccinated, there were reported (1) to have escaped smallpox, 195; and (2) to have taken smallpox after vaccination, 6.
Of the six who had thus taken smallpox, scarcely one had a satisfactory vaccine cicatrix; and in five out of the six the smallpox was mild and modified.
It is possible that few of these vaccinated persons had been exposed to the variolous contagion. But, at a Meeting of the Medical Society of London, three or four years ago, out sixty practitioners being present, all of them having repeatedly exposed themselves to smallpox infection, it was ascertained by a show of hands that only four or five had ken the disease after vaccination; and in them the proofs of true vaccination were not adduced. Moreover, the average age was about 35 to 45 or more, showing that vaccination es protect *long after puberty*, a very large majority of those both vaccinated and exposed to variolous contagion. T.H.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
255. HUNTINGTON, FRED., F.R.C.S., (Hull), Senior Surgeon to General Infirmary.	None.	I do not at present believe it; as I have hitherto not been able to trace any of the within-named diseases to vaccination.	I have never witnessed anything of the kind; but I have repeatedly heard it asserted very strongly, by the parents of those who have been supposed to labour under such affection, that their children previous to vaccination had been perfectly free from any complaint, but that since the vaccination their skin had been covered with eruptions, and the child constantly ailing.	I do.
256. HUSSEY, E. L., F.R.C.S., (Oxford), Surgeon to the Radcliffe Infirmary.	I have not any doubt that vaccination confers a very large exemption from attacks of variola. During the epidemic smallpox in 1854, I vaccinated a baby about two months old (under my care in the infirmary) with club feet, the mother being admitted with the child. About six weeks afterwards the mother, who had a clear vaccine cicatrix on the arm, was attacked with variola in a mild form. She continued to suckle the baby during the whole time. The child throve well, and never had any symptoms of the disease, then or since. In my own experience, I have never known a death from variola after vaccination; nor have I known even a severe attack of that disease after vaccination. By the word "vaccination," I understand the production of the regular vaccine vesicle by inoculation; and not simply (as uneducated people often do) the surgical operation of inoculation with vaccine lymph, which may or may not be absorbed, and produce a vesicle.	I have not any reason to think that vaccinated persons become, after vaccination, more susceptible of *any* disease, or that their health is in any way disadvantageously affected. On the other hand, I have observed that persons *marked with variola* are slow in recovering from general disease. Whether it is that the attack of variola has injured the powers of the constitution, or that those of bad constitution suffer most from the attack, and that in such subjects the marking or "pitting," is most frequently seen, more extended observation may be required to say. But, of the *fact stated*, that those who are marked with variola are slow in recovering from disease, I am perfectly sure.	(*a*) I have not any reason to think that lymph from a true vaccine vesicle has ever been the vehicle of any infection but the vaccine disease. In 1854, a boy six years old, on whom I had performed lithotomy in the infirmary, was re-admitted under my care on account of an abscess which formed in the [illegible]um. As he had been exposed to the contagion of smallpox and had never been vaccinated, I vaccinated him in the arm. When the vaccine vesicle rose, lymph was (incautiously I think) taken from it, and inserted in the arm of one of the nurses, who, although having a clear vaccine cicatrix, wished for a repetition of vaccination. The boy had rather a severe attack of variola, which appeared about the tenth day after the vaccination. A spurious pustule formed in the nurse's arm; but she had no other symptom. The brother and sisters of the boy, who had variola about the same time, and had never been vaccinated, are deeply scarred by it. The boy himself is not marked. (*b*) "Medical practitioners" are now, I think, so well acquainted with the vaccine vesicle in its different stages, that they are not likely to take lymph from an impure source. I can believe that the mistake may have happened formerly, but I have not any knowledge of it. Such a thing is mentioned in the Report of the Committee of the House of Commons in 1833.	In every case which has been before me professionally I have recommended vaccination at an early period; but, if people are to be forced by process of law to submit their children to the surgical operation, and to take the children twice to the place of operation, on one of those occasions on a day which cannot be changed, a longer time than three months from the child's birth ought, I think, to be allowed.
257. HUTCHINSON, F., M.D., (London), Surgeon to the Western City Dispensary.	I have no doubt of it.	No.	I say 'no' to this question, most emphatically, after a large experience as a private practitioner, and a public vaccinator, extending over a period of twenty-five years.	I recommend that all children be vaccinated after the second and before the fourth month of their age, except in case of ill health. And as a test of efficiency, and as a safeguard against defect, I generally re-vaccinate about the age of puberty.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
258. **Hutchinson, J.** (London), Surgeon to the Metropolitan Free Hospital.	None whatever.	None whatever.	I believe that I have seen four or five instances in which local syphilitic affections were induced by vaccination performed under ordinary circumstances, and by duly qualified men. In one or two of these the constitution suffered also, as seen by appearance of disease in several parts; but in others it was not perceptibly affected. I have not known any cases in which other diseases were unintentionally inoculated instead of vaccination.	Most certainly.
259. **Ikin, J. J.**, F.R.C.S., (Leeds), Surgeon to the Hospital for Women and Children.	I have no doubt that successful vaccination lessens the liability to smallpox, modifies it when it does exist after vaccination, and confers an almost absolute security against death from smallpox. I speak from considerable experience as a public vaccinator of old standing,—fifteen years.	I do not consider, or suspect, that vaccinated persons are more susceptible of infectious diseases, or of phthisis, or that their health is in other ways injuriously affected by vaccination from proper lymph.	(*a*) I have no reason to believe true vaccine lymph, from a healthy child, could ever be a vehicle of syphilitic, scrofulous, or any other constitutional infection or disease. (*b*) But I think more care is required to be taken in obtaining vaccine lymph from healthy children.	I strongly recommend that vaccination should be universally performed at early periods of life.
260. **Image, W. E.**, F.R.C.S., (Bury St. Edmund's,) Senior Surgeon to the Suffolk General Hospital.	None whatever.	None whatever.	None whatever.	Certainly; Yes.
261. **Inman, Thos.**, M.D., (Liverpool), Physician to the Northern Hospital.	No.	No.	Not from personal knowledge. I have met with two instances from 'hearsay,' in which there was very strong reason to believe that syphilis had been imparted to the child by vaccination.	Yes.
262. **Isaacson, W.**, (Huntingdon), Public Vaccinator to the Union.	I have no doubt whatever upon either of these two points.	I have never seen a case, nor do I believe it possible that vaccination can render a person more susceptible to any other infectious disease, or to phthisis, nor have I ever seen any injury to health result from it.	(*a*) I have never had any reason to believe or suspect this, and cannot refer to a single case in support of it. (*b*) I have never seen an instance of this, nor do I know of one.	I do; but I think the period for vaccination might be extended to five months.
263. **Jackson, H.**, F.R.C.S., (Sheffield), Senior Surgeon to the General Infirmary.	I have not the slightest doubt of the efficacy of vaccination in affording exemption from smallpox to a very large proportion of the population, nor of its decidedly modifying power in cases of smallpox occurring after vaccination: (for such cases will occur, in the same way that smallpox will recur after inoculation for the smallpox,) by which deaths from that disease have become extremely rare.	I do not believe that those who have been properly vaccinated are thereby rendered susceptible of any other disease whatever, or that their health is afterwards affected.	(*a*) I do not believe that lymph from a true Jennerian vesicle, in a healthy subject, has ever produced syphilis, scrofula, or any other constitutional disease. I have, however, seen that the inflammation set up by vaccination has brought out an eczema, to which there was evidently some tendency: for in other children of the same family, the same rash has been induced by the irritation of teething, occurring before vaccination has been performed, and recurring regularly with every tooth until the completion of dentition, when it has entirely disappeared. (*b*.) Of course no educated medical practitioner would take lymph from an unhealthy child, or from an imperfect or doubtful vesicle.	I should always recommend early vaccination, as a matter of safety; but I am of opinion that the period of three months after birth, allowed by the Act of Parliament, is much too limited. For though many children may be successfully vaccinated within that period, cases very frequently occur in which (for reasons of which the medical attendant alone can judge,) the operation ought to be deferred for a much longer period.

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264. **Jackson, Mark W.**, F.R.C.S., Senior Surgeon to Stamford and Rutland General Infirmary.	I have no doubt but that successful vaccination very materially exempts persons from smallpox. Those taking smallpox after vaccination have the disease in a mitigated form, and rarely die from its effects.	I do not think that vaccination renders persons liable to or susceptible of any other disease, infectious or otherwise, or that it any way ever injures the health.	(*a*) Presuming that all medical men use healthy lymph, producing a perfect vesicle, I do not think that any infectious disease can be given to the person vaccinated. (*b*) I should deem it impossible for a professional man to use any but the true vaccine virus, so far as he can possibly know.	I should recommend that, in almost all cases, vaccination should be performed at a period not later than three months old. I believe nevertheless, that vaccination renders persons of all ages less susceptible of, if not exempt from smallpox, and that if once successfully done, it never requires repeating.
265. **Jago, James**, M.B., (Truro,) Physician to Royal Cornwall Infirmary and Truro Dispensary.	No.	No.	No.	Yes.
266. **James, J. H.**, F.R.C.S., (Exeter), Surgeon to the Devon and Exeter Hospital.	I have no doubt.	Answered under No. 3.	(*a*) I think it not improbable that the lymph secreted in the vaccine vesicle may partake of any peculiarity existing at the time in the blood of the individual secreting it, and therefore I think it would not be safe to use lymph taken from a vesicle, when the child either showed symptoms of syphilis, scrofula, or any other cachectic disease, or when such child was likely to inherit such disease. I think this persuasion is very general, and hence the solicitude of parents and surgeons to obtain lymph from healthy children. I have frequently seen an unhealthy condition follow vaccination, although in the great majority of cases, this is not so. And when it is, in a great proportion, it is the result rather of febrile excitement, or the intrinsic change in the blood, which vaccination undoubtedly produces, and is so great as to continue through life. I may observe, however, that the same objection lies against inoculation of smallpox. (*b*) The mistake alluded to in the latter part of this question, I conceive, is barely possible.	I think it was a very great mistake, in a medical point of view (independently of the arbitrary character of the enactment) to require vaccination to be performed at three months. Nature seems to have intended an exemption from the influence of infectious diseases at a very early period of life, which indicates the impropriety of forcing any upon very young infants. Besides, the wear and constitutional disturbance is thus greater than they can well bear, for the vesicles and attendant inflammation are equal in extent to what occur in the adult, albeit the subject is vastly smaller. I should say that the time ought at least to be extended to six months; i.e. to the commencement of dentition.
267. **James, W. W.**, F.R.C.S., (Exeter,) Surgeon to the Dispensary.	No doubt whatever exists in my mind, as to the great comparative exemption from varioloid disease of those who have undergone vaccination. And moreover, during a considerable experience, especially among the poorer classes, I can adduce but few instances of those dying from smallpox who had been vaccinated.	I am not aware of any infectious disease having any relative connection with vaccination. Phthisis, at all times, I believe to be a rare disease with children, at that time when they are most generally vaccinated. Every practitioner must have seen that after vaccination, children here and there obtain severe inflammation of absorbents, enlarged glands, and the like; none of them, as far as I am aware, terminating fatally. I think also, that, in a few cases, I have seen a kind of eczema coming on, and in two cases, also pustular ophthalmia shewed itself.	We all have, to a certain extent, preconceived notions, and one cannot help, at first, giving an affirmative answer to this question without knowing the reason for so doing. I certainly have, of myself, no knowledge of such diseases being communicated in the manner mentioned. Indeed, instances have occurred here where healthy children have been unwittingly vaccinated from syphilitic children, and no bad result ensued. At the same time I think, from the present uncertain opinions with reference to vaccine matter, no conscientious or judicious vaccinator would use any lymph but that from a healthy child and healthy parents. I may add, that in more than one instance, I have known children labouring under mesenteric disease become fat and healthy after vaccination, and so remain.	I believe every child, without exception, should be vaccinated within four months of birth, for two reasons. First, by diminishing the amount of soils for the smallpox germ to vegetate in, you help to control its power. Secondly, after that age, children becoming more troublesome, have a greater tendency to inflammation, and the like; since one not unfrequently sees in children under vaccination of one year and upwards that the pressure and rubbing of tight dresses, under constant movement, produces the above unfavourable result. I need hardly mention how desirable it is that the vaccine matter should be used fresh, and taken on the eighth day. For surely the pure serum of a vaccine vesicle is, at all events, less likely to be the agent for communicating any other poison to a healthy child, than if we allowed that serum to degenerate as it were, and become purulent.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence, a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
268. **Jeaffreson, H.**, M.D., (London), Physician to St. Bartholomew's Hospital.	I have no doubt whatever that such is the case.	I do not believe that vaccination, when carefully and judiciously employed, is in any way disadvantageous to health, or renders a person more susceptible of any infective or other disease.	(*a*) I have no doubt. (*b*) I can hardly believe this would occur. I certainly have never known it.	I do.
269. **Jenner, W.**, M.D., (London), Physician to the Hospital for Sick Children, and to University College Hospital, and Assistant Physician to the Fever Hospital.	I have no doubt that successful vaccination confers on persons, subject to its influence, a very large exemption from attacks of smallpox, and almost absolute security against death from that disease, for some years after the vaccination.	My experience is altogether opposed to the idea that vaccination increases the mortality from infective diseases. My connection with the London Fever Hospital, and the Hospital for Sick Children, has caused me to see a very large number of cases of hooping-cough, measles, scarlet, typhus, typhoid, and relapsing fever; but I have never had the slightest reason to suspect that the vaccinated were more susceptible to the contagious influence, than the unvaccinated, or that they suffered more severely when affected with contagious disease.	In the discharge of my duties as Physician to University College Hospital, and the Hospital for Sick Children, I must have had, during the last six years, more than thirteen thousand sick adults and children under observation; and in no case have I seen reason to believe, or even suspect, that any constitutional taint had been conveyed from one person to another by vaccination; or that any other disease had been unintentionally inoculated. I have seen cases where patients have dated, and apparently with truth, the commencement of their suffering from scrofulous affections to an attack of smallpox.	I am fully satisfied, from what I have seen, that the State would confer an inestimable boon on the community by enforcing early and general vaccination. If all children were vaccinated at an early period of life, an immense amount of suffering and many lives would be saved.
270. **Jennette, Matthew**, (Birkenhead), Consulting Surgeon to the Hospital.	I have not.	Certainly not.	(*a*) I believe that lymph, from a true Jennerian pustule, never is a vehicle for such diseases. (*b*) And I never knew or heard of unintentional inoculation with another disease by a duly educated medical man.	I do, decidedly.
271. **Johnson, C.**, Junr., F.R.C.S., (Lancaster), Inspecting Surgeon under the Factory Act, and Surgeon to the Infirmary.	I have no doubt that successful vaccination confers on persons who have been subject to its influence a large exemption from attacks of smallpox. I have never had a case of smallpox in a patient whom I myself had vaccinated; but I have seen a slight eruption in some persons who, I had reason to believe, had been previously vaccinated. But in no case did death, or blemish, take place.	I can see no reasonable grounds for any such belief.	I have never used vaccine matter taken from a person suffering under any of these diseases, to my knowledge. I should avoid any matter taken from a person subject to cutaneous or specific disease; though I have no facts to induce me to believe such diseases are so communicated. A surgeon might, by mistake, use old matter; and occasionally, using every care, he will meet with cases where the constitutional irritation is very severe, and the eruption of an anomalous character. But I doubt very much whether specific diseases are ever communicated by mistake.	Previous to the passing of the Vaccination Act, I did not usually vaccinate children under six months old, except when I had reason to dread smallpox. I have frequently vaccinated successfully at six weeks. I think the time fixed should be not longer than six months. I think under three months, especially in winter, is, as a rule, too short. Children are frequently brought many miles in country places; and, in winter I think they frequently suffer from exposure.

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272. Johnson, F. H., (Sunderland).	(*See* below.*)	—	—	—
273. Johnson, H. C., (London), Surgeon to St. George's Hospital.	No.	No.	No.	I do.
274. Johnstone, James, M.D., (Birmingham), Senior Physician to the General Hospital.	I have no doubt whatever.	In some instances children appear to be more subject to some cutaneous affections, as eczema and urticaria, after, than they were before, being vaccinated; but I never saw or heard of any more serious result of vaccination.	No.	Yes.
275. Jones, H. B., M.D., F.R.S., (London), Physician to St. George's Hospital.	No; I consider the expression "almost absolute" is too strong. I should say, "great security."	No. In some unhealthy children I have known impetigo and eczema; and both together attributed to the vaccination; and I have considered it most likely that the vaccination was the exciting cause of these diseases.	No.	Yes.
276. Jones, John, (Chester), House Surgeon to the Infirmary.	No.	No.	No.	Yes.
277. Jones, R., F.R.C.S., (Leamington), Surgeon to the Hospital.	None whatever.	Not in the least.	(*a*) No. (*b*) No.	I do.
278. Jones, R., (Carnarvon), Surgeon to the County Gaol.	None whatever.	I have no reason to suspect it; nor do I believe it to be likely or even possible.	(*a*) None. (*b*) I do not think such a thing possible.	I do, most decidedly.
279. Jones, Thomas, (Chesterfield), District Medical Officer to the Union, and Surgeon to the Workhouse.	I am quite sure that successful vaccination confers almost complete exemption from attacks of smallpox; and I would say nearly complete immunity from death by the disease (smallpox).	Vaccination, in my experience (which is large), has never, because of less susceptibility to smallpox, made any person more susceptible to other diseases, whether phthisis or infective disease; and that the health of the patient is not rendered more disadvantageous, I am most fully convinced.	(*a*) During the past six years, I find I have vaccinated about 1062 children. The result of my experience leads me positively to state that in no instance have I ever seen a true Jennerian vesicle the vehicle of syphilitic, scrofulous, or other disease; (*b*) nor can I conceive that such a thing would occur in the hands of a duly educated practitioner.	I am of opinion, from observations deduced from the above number of cases, that it is (all but) essential the operation should be performed at an early period of life.

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* Before the passing of the Vaccination Act, and when the operation was voluntary, a much smaller proportion of children were presented for vaccination, although the custom was then pretty generally established. Certain prejudices existed, on account of the supposed transmissibility of scrofulous or venereal diseases, and told to some extent against its general adoption. These seem to me to have been much modified by the supposed security given in official responsibility, and the increased number of the vaccinated. One instance of this I may mention. A man obstinately prejudiced against vaccination refused to allow his children to be protected. His wife, herself vaccinated, tried in vain to persuade him. At last one child took smallpox in the confluent form, a second followed, and then the father received the disease, the mother alone escaping. All recovered, and the man never since objected to vaccination.

I have also found re-vaccination on the increase; and whenever rumours of an epidemic occur, adults previously vaccinated request it to be repeated. Since the passing of the Act I have vaccinated 330, and during twelve years 1250 individuals; none of whom to my knowledge have since taken smallpox; nor can I recal one instance during the twelve years where this occurred in a patient under ten years of age. I have met with cases in which variola has occurred after vaccination; but it was, without exception, in adults.

Of the protective influence of vaccination I would adduce the following examples, recently observed. A family consisting of a man and his wife, four children, and the man's brother, were attended by me. The wife, on whose arm I could not find any cicatrix, although she thought she had been vaccinated, took confluent smallpox, aborted, and died. Her husband, not vaccinated, received the disease in the same form, and recovered, after a severe illness. The brother, who was vaccinated, became infected, and had [illegible] imperfect pustules, conical, and with no central absorption. The four children all escaped, all having been vaccinated.

Again: a man visiting the above, and being non-vaccinated, took the smallpox. His wife complaining of suspicious symptoms I re-vaccinated her, and nothing further occurred, two children in this man's family also escaping.

In another instance, a sailor, after being three weeks at sea, was attacked with confluent variola: he had not been vaccinated; his wife and two children had; and the children and wife were not infected.

These three groups occurred to me simultaneously during last month; and strange to say, they are the only cases of smallpox I have attended, in a tolerably extensive practice for nearly five years.

The comparatively small number of cases of smallpox which we now meet with in practice has always surprised me, especially when the enormous increase of our population is considered; and judging only from this fact, I should attribute the decrease to some preventive cause operating upon the masses. The singular and isolated grouping of cases which we do find it occurring, reminds me forcibly of what we observed in cholera when it last attacked the town (Sunderland). Wherever precautionary measures were observed the contagion never extended beyond the individuals exposed to its immediate contact, and left untouched even the adjoining houses wherein those measures were adopted. The difference is, that in these instances persons constantly about the sick escaped, and were almost invariably found to be of the vaccinated class, while others not vaccinated in a very large proportion took the disease. "Cæteris paribus," the influence is as strong as need be; and I believe that in the country, from some causes I cannot attempt to explain [illegible] see this great sanitary law more fully exemplified than our brethren in the metropolis. F.H.J.

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280. **Jotham, G. W.**, (Kidderminster), Surgeon to the Infirmary.	I have not the least doubt that successful vaccination is almost universally preventive of smallpox. The few who have had it after vaccination have never been, in any instance I have seen, seriously ill; and I consider that by vaccination an almost absolute security against death from smallpox is conferred.	I do not think vaccination produces any greater susceptibility to disease of any kind, than existed before; nor is the health in any way disadvantageously affected. I have repeatedly seen it after the smallpox.	I am fully convinced that lymph from a true Jennerian vesicle is never a vehicle of any other disease; nor do I think any other disease has been unintentionally conveyed by a duly educated practitioner.	I think that, from the second to the fourth month, at any rate before the system is disturbed by dentition, is the best time for the performance of the operation.
281. **Julius, Frederic**, M.D., (Richmond, Surrey).	I have no doubt whatever. I feel sure it confers on the individual absolute safety.	I do not believe persons are rendered more susceptible of other diseases, or that the health is in any way impaired.	I do not believe such a case has ever occurred. Nor do I think vaccine lymph has ever been a vehicle of infection.	In my opinion every child should be vaccinated within six months.
282. **Keenlyside, R. H.**, M.D., (Stockton-on-Tees,) Physician to the Dispensary.	I have no doubt whatever.	I do not believe that vaccination causes any susceptibility to any other disease, or that it tends to injure the health.	(*a*) I have never seen any reason even to suspect that these diseases arose from vaccination. (*b*) I cannot think it at all likely for this to occur.	I decidedly think it proper for vaccination to be performed in the earliest period of life, except some marked reason exists, in individual cases.
283. **Keith, Wm.**, M.D., (Aberdeen), Senior Surgeon to the Royal Infirmary.	Not the slightest doubt.	After much experience, I can affirm that in no one instance did any such ever follow. Health is in no way deteriorated by the practice of vaccination.	(*a*) None. (*b*) Never.	I do urgently recommend early and universal vaccination.*
284. **Kellock, W. B.**, (London).	None whatever. And, should an attack occur, almost perfect security against the permanent indentations of the skin, which so constantly follow "natural smallpox," as well as death.	I believe not.	I believe not.	Yes; all healthy infants; especially those fed on breast milk, of ten or twelve weeks old.

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* I think the most stringent measures should be adopted by Parliament to enforce vaccination. Why should life and health be perilled by the ignorance and the prejudices resulting therefrom, of the uninformed classes of the community? Smallpox has been epidemic in Aberdeen this summer, much owing to non-vaccination. From 1st January to 1st October, in the city and suburbs, there have died of smallpox, 59. In our hospital, from 1st January to 30th October, there have been 56 cases treated, of which were cured, 42. died, 9: remain under treatment, 5.

In private practice, I was called to see a girl of 18, in smallpox, from the West Highlands. She had never been vaccinated, and was the last living of a family of ten, seven of whom had been cut off by smallpox. The father I saw and questioned. Not one of them had been vaccinated. He felt no remorse of conscience, but doggedly affirmed his belief that it was opposing the will of the Almighty to use means to evade or escape disease. Verily, those have much to answer for who obstructed and defeated the Bill for extending National Education to the masses lying in grossest darkness in Scotland, and over all Scotland: especially the country parishes. W.K.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
285. **Kempe, Arthur,** (Exeter), Surgeon to the Hospital.	I was one of the public vaccinators in this city (Exeter) for many years, and have vaccinated a large number of children: average number annually, since 1841, about 250. I have no doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease. During 15 years, when I was one of the District medical officers for this city, there were several epidemics of smallpox. I invariably found that the earlier cases occurred in children unvaccinated; but that, after a time, persons subject to vaccine influence were attacked: but, with a very few exceptions, very mildly. Still the cases of smallpox after vaccination bore a very small proportion to those in whom it occurred naturally. I only remember one death from smallpox after vaccination, and that was during the last epidemic of that disease, when I had between 30 and 40 deaths in children unvaccinated. And it should be added, that the mother of the child who died after vaccination assured me that, at the time it was vaccinated I told her that it was not successfully done, and that I should wish to revaccinate it at a future time. She, however, neglected to bring it.	I have no doubt that in some cases the lymph from a true Jennerian vesicle does disadvantageously affect the health of the vaccinated person; and that this generally appears in the form of some cutaneous affection, which is more or less obstinate in character, but which eventually disappears without leaving, so far as I am aware, any permanent injurious effects The former part of this question I have no means of answering.	I feel quite sure, and have repeatedly proved, that lymph taken from a true Jennerian vesicle, in a child suffering from congenital syphilis, measles, hooping cough, &c. &c., does not convey to the vaccinated person any constitutional infection. And I feel equally persuaded that the same thing holds good in scrofulous and other affections. I do not think that, in the hands of duly educated men, sufficient attention is always paid to the condition of the vesicle; and suspect that lymph is sometimes taken from a vesicle *not* a true Jennerian one; and that, consequently, not only is the vaccinated person rendered susceptible of smallpox, or rather not made less susceptible of it, but is inoculated with lymph likely to produce constitutional disturbance, generally, I believe, and shewing itself in some form of skin disease.	I have no hesitation in recommending that the operation of vaccination, generally, should be performed before the termination of the fourth month of life.
286. **Kenny, M.S., M.D.,** (Halifax,) Consulting Physician to the Infirmary and Dispensary.	Most assuredly. No doubt whatever. My belief, after 45 years' extensive experience, both in public institutions and in private practice, is, that where modified smallpox occurs after vaccination, it would be equally certain to arise after inoculation. I have never seen smallpox fatal as occurring after vaccination.	No none whatever.	(*a*) I cannot say that I have; and I feel fully assured that inoculation from the smallpox pustule, or with the smallpox virus, would, if such liability existed, be equally certain to be the vehicle or means of communication of other diseases. (*b*) No.	Most certainly. I consider vaccination one of the greatest boons that has ever been conferred upon the human race, and as averting one of the greatest scourges that mankind has suffered from. I advise its early adoption.
287. **Kesteven, W. B.,** F. R. C. S., (London,) Vaccinator for the District of St. John's, Upper Holloway.	I have not only no doubt, but I consider that I have proof to a demonstration, that vaccination confers what is stated in the question. This proof is afforded by what I have witnessed at the Smallpox Hospital, in confirmation of the statistics already published by Mr. Marson, and by the results of careful records of all the cases I have re-vaccinated since February, 1852. The result of which tables is, that, in proportion to the number and depth, &c. of the primary cicatrices, was the inefficiency of the re-vaccination, and *vice versâ*.	I have not. I have kept a careful note of every vaccinated case since February, 1852, and have been a public vaccinator since 1840, and have the records of cases accessible. Moreover, I have personally known a large proportion of the children I have vaccinated during the last eighteen years, and have never seen any ill effects result from the operation. I do not believe that vaccinated persons become more susceptible of other diseases, but the reverse; as they are protected from the proclivity to disease, so often induced by attacks of smallpox.	No.	I always advise that vaccination should be performed at about the age of three months, as at that age the child is sufficiently old to endure the full effect of vaccination, and is not yet open to the disturbances of dentition, and their consequent interference with the progress of the vaccine disease.

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288. KEYWORTH, HENRY, (York,) Surgeon to the Dispensary.	It is my decided opinion that successful vaccination does very greatly exempt persons from attacks of smallpox. There cannot be a doubt but that the mortality in cases of smallpox occurring in persons successfully vaccinated, is very greatly diminished.	I do not believe that the health of vaccinated persons is in any way injured, provided the vaccine lymph be good; on the contrary, I believe that the health of delicate children is often improved after vaccination, when the lymph has been taken from a healthy child.	(*a*) I believe that lymph taken from a true Jennerian vesicle, occurring in an unhealthy scrofulous child, may injuriously affect the health of a child vaccinated with such lymph. (*b*) I do not believe that unintentional inoculation with some other disease can occur, in the hands of a properly educated and experienced medical practitioner.	I do; but I think that compulsory vaccination would be more regularly observed, if the time were extended beyond three months.
289. KINGLAKE, HAMILTON, M. D., (Taunton,) Physician to Taunton and Somerset Hospital.	No doubt whatever.	No.	I cannot give an equally positive answer to this question.	Yes.
290. KNOWLES, G. B., F.R.C.S., (Birmingham,) Surgeon to Queen's Hospital.	I have no doubt whatever upon the subject, and I state this opinion freely and unreservedly, after an experience of more than forty years' extensive practice.	I have no reason to believe or suspect that such a result ever occurs, nor do I believe that the general health is ever disadvantageously affected by vaccination.	I have no reason to believe or suspect that lymph from a true Jennerian vesicle has ever produced any constitutional affection, not even a syphilitic taint, although some may consider this a debatable question.	I do most earnestly recommend, except for some special reason, that vaccination be universally performed at early periods of life.
291. LANE, S.A., F.R.C.S., (London,) Surgeon to St. Mary's and the Lock Hospitals.	I have not.	I have not.	I have not.	I do.
292. LATHAM, P.M., M.D., (London), Physician Extraordinary to the Queen, formerly Physician to St. Bartholomew's Hospital.	No doubt whatever.	It is easy to assert at random the affirmative of this proposition; but it would require the experience of a life directed to the particular subject, in order to collect and study the facts which would be necessary to confirm or confute it. I do not pretend to have had my mind constantly alive to all that has been said from time to time for and against vaccination. But, taking facts as they have fallen in my way during a practice of 40 years, I have seen none which could suggest to me any honest belief or suspicion, that "persons in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected."	(*a*) I have never met with the slightest proof of it; and the suggestion of its being possible amazes me. (*b*) I should hardly think the mistake could happen.	Indeed, I do.
93. LAW, T. S., F.R.C.S., (Barnstaple,) Surgeon to North Devon Infirmary.	No.	No.	No.	Yes.
94. LAWRENCE, J. T., (Launceston).	I have not the least doubt, in fact I am quite certain that successful vaccination gives (except in very few instances) complete immunity from smallpox.	Certainly not. I am yet to meet with the case in which I can attribute susceptibility of any disease to vaccination.	No, I have not but I firmly believe that in many cases, vaccine lymph, in the country, is not sufficiently carefully taken from a true Jennerian vesicle, hence the cases of smallpox after reputed vaccination.	Yes; and I myself never re-vaccinate my own patients, except at their own particular request. I believe that vaccination once properly performed gives perfect security for life.
95. LAWRENCE, W., President of the Royal College of Surgeons, F.R.S., Surgeon Extraordinary to the Queen, Surgeon to St. Bartholomew's Hospital.	No.	No.	No.	Yes.

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296. **Laurie, J. A.**, M.D., (Glasgow), Surgeon to the Royal Infirmary.	No doubt whatever.	No reason whatever.	(*a*) I have practised vaccination for 25 years, and never met such an accident, and do not believe in its occurrence. (*b*) No.	Yes. In my experience, I do not recollect any instance in which I deemed it prudent to delay vaccination beyond the age of six months. I recommend that it should be done towards the end of the third month, as a general rule.
297. **Laycock, T.**, M.D., (Edinburgh), late Physician to the York Dispensary.	No doubt whatever.	This question is capable of varied interpretations. Does 'infective' mean anything more than infectious?	I think this may be reasonably "believed" or "suspected;" and I think a duly educated practitioner may be a negligent, careless, or thoughtless practitioner, and may inoculate unintentionally with some other disease. Our knowledge of morbid poisons is too imperfect to speak positively, as to what may happen, or what may be "suspected" reasonably or not.	Very decidedly.
298. **Lee, Henry**, (London), Surgeon to the Lock Hospital, and to King's College Hospital.	—	—	I have never seen a case in which there was reason to believe that syphilitic poison had been inoculated in the operation of vaccination. I have never known any secondary syphilitic affection communicated by inoculation with the lancet. I may, however, state my conviction, derived from personal observation, that animal poisons are sometimes unintentionally introduced into the human system by inoculation. The cases which I have known have occurred through the same lancet having been used for different purposes; and I conceive that it might be the means of preventing accidents of the kind, if lancets used for vaccination were never employed for anything else.	—
299. **Lee, Robert**, F.R.S., (London), Physician Accoucheur to St. George's Hospital.	No doubt.	No reason.	Never.	I do.
300. **Leonard, C.**, (Bristol), Surgeon to the House of Correction.	No; I have had satisfactory evidence of its protecting influence, in cases of smallpox affecting members of a family. Those who had been vaccinated escaped.	I have not.	I have not.	Certainly; for you cannot tell how soon the individual may be exposed to the influence of smallpox.
301. **Leppington, H. M.**, (Grimsby), Union Medical Officer.	Not any.	Not any.	(*a*) No. (*b*) I am not aware of any case of the kind.	I do; within four months.[*]
302. **Lever, J. C. W.**, M.D., (London), Physician Accoucheur to Guy's Hospital.	Not the least.	I have not.	I must say *yes*. I have known syphilis communicated to a child by the hand of a supposed but legally educated medical practitioner.	I do.
303. **Lingen, C.**, M.D., (Hereford), Senior Surgeon, General Infirmary.	None.	I have not.	I am not able to answer this question from observation.	I do.

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[*] I am of opinion there are two ways that vaccination is exposed to popular abuse: the one is when pure vaccine lymph is inserted when the blood is vitiated, or strumous, it then produces a skin disease other than the vaccine. The other is where the medical man has taken the lymph *too late*, and it is opaque, or approaching to pus, the insertion of which is as objectionable, really, as the former one. H.M.L.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
304. **Lithgow, A.**, (Weymouth), Surgeon, Royal Navy.	I have no doubt whatever that successful vaccination not only confers on persons subject to its influence a very large exemption from smallpox, but that it may be made the means, when efficiently performed, of almost absolute security against that disease.	None whatever; never having seen any disease produced that could, in the remotest way, be supposed to be caused by it.	(*a*) I have not; nor do I think such a case possible. (*b*) Nor do I think unintentional inoculation with other disease possible, in the hands of a properly educated practitioner.	I consider that the present period of three months is rather too short, and would extend it to four; later than which, I think, vaccination should not be deferred, except in special circumstances.
305. **Little, I.**, (Halifax), Senior Surgeon to the Infirmary.	I have not any doubt, when vaccination is properly performed and attended to.	I have no reason to suspect anything of the kind.	(*a*) During a practice of 36 years, I never saw any disease produced from vaccination; but I never vaccinated from lymph taken from a child in whose family I suspected any disease. (*b*) Not that I am aware.	Certainly, I do.
306. **Little, W. J.**, M.D., (London), Senior Physician to the London Hospital.	None whatever.	None whatever.	I have never witnessed any fact that could afford the smallest grounds for such belief.	I do.
307. ? (Liverpool.)	I have no doubt but that many persons are.	I should say not.	I do not think so, although I have frequently heard the matter blamed by parents, when there has been both syphilitic and scrofulous affections in the system; and I know myself the matter was perfectly good.	I do.
308. ? (Liverpool.)	None whatever.	No.	No.	Yes.
309. **Lloyd, E. A.**, F.R.C.S., (Walthamstow), Surgeon to Christ's Hospital, and Consulting Surgeon to Infant Asylum, Wanstead.	I have no doubt on either point. But some individuals (it is the case with three of my own children) are not susceptible to vaccination. What then is to be done? Is it not cruel to subject them to death from natural smallpox, when inoculation with that disease might save their lives?	I have not.	No instance of either kind has ever come under my cognizance.	I do.
310. **Lochee, A.**, M.D., (Canterbury), Senior Physician to the Kent and Canterbury Hospital.	I have no doubt whatever upon either of these points, and on the contrary, am satisfied that vaccination, when properly performed, confers both of these advantages.	I have no reason to believe or suspect anything of the kind; my own experience furnishes me with no instance of such a result. The answer applies only to primary vaccinations, as I have occasionally known the health to be disadvantageously affected for a time after re-vaccination.	(*a*) I have not only no reason to believe that such a thing has ever happened, when the lymph has been taken from a true Jennerian vesicle; but I should also require the strongest evidence to convince me that it was even possible. (*b*) I hold that the result suggested in the latter part of this question, could never occur under the conditions stated.	Certainly, I do; because, if vaccination be a preservative against smallpox, which in the immense majority of cases I am sure it is, the sooner it is resorted to the better.
311. **Locock, Sir Charles**, Bart., M.D., (London), First Physician Accoucheur to the Queen; President of the Royal Medico-Chirurgical Society.	I have no doubt.	I have never had reason to believe it.	I have not any reason to believe any such contingency.	I do recommend early vaccination: from six weeks to three months of age; and a second vaccination after puberty. I think that the general habit of prevalent re-vaccination at seven years old is a mistake; that because they are proved safe *then*, no further trouble is taken; and that if protection wears out it is usually after puberty. This has been tested on a large scale in the Prussian Army.

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312. **Löschner**, J., (Prague), M.D., and Professor on the Diseases of Children.	The first part of the question can be answered with approximative precision. If in relation to the last smallpox epidemic of the year 1848/49 the number of not vaccinated persons belonging to the vaccination district of the Franz-Joseph Hospital be estimated at 500, and the number of vaccinated persons in the same district at 5,000, the ratio of cases was, in the vaccinated 18, in the not vaccinated persons 27·6 per centum. In respect of sporadic smallpox the ratio is still more favourable to the number of vaccinated individuals, that is to say, to vaccination. Accordingly vaccination is in the plurality of cases a guard against smallpox. The second part of the question can be answered precisely, from the records of our Hospital. Vaccination guards almost perfectly against a fatal issue; for in the smallpox epidemic alluded to, lasting from June 1848 to May 1849, of 91 vaccinated persons 5 died; whilst of 138 not vaccinated persons 32 died. Accordingly the ratio of mortality is in the vaccinated 5·49; in the not vaccinated individuals 23·1, per centum. As regards sporadic cases (250) occurring within the last two years, the ratio of mortality in the vaccinated persons has been ·0 per centum, in the unvaccinated 15·59 per centum: for all the 64 vaccinated patients have recovered, and 29 of the 186 not vaccinated persons have died. Another proof of the preservative power of vaccination might be afforded by the circumstance, that, whilst in a first vaccination it is exceptional for lymph *not to take*, in re-vaccination the case is reversed, and a *perfect taking* of the lymph is exceptional.	As to the second question, I can afford no statistical information, since not all children vaccinated by us come under our treatment, if subsequently attacked by disease. Approximatively the question must be answered with *No*:—and so much the more so, as according to the evidence contained in our hospital records (Krankenprotokolle) many of our scrofulous and tuberculous patients are children who have not been vaccinated.	I can deliver no statistical information relating to the first part of the third question. Generally speaking, such information could only be founded on observations made in a very large district. I know of no decisive case, telling in this respect against vaccination. The cases of children in other respects previously healthy falling sick after vaccination are according to our experience in the average very infrequent indeed: and in such cases (before ill effect is ascribed to vaccination,) proof should first be afforded of the disease not having been produced by some other cause. I must answer the second part of this question with an unqualified *No*.	Universal vaccination is, according to my experience, to be considered as a benefit for the State and for every family.
313. **Lonsdale**, H., M.D., (Carlisle), Physician to the Cumberland Infirmary.	No doubt whatever.	I have never been able to trace any bad consequence to vaccination.	Never seen any constitutional infection from vaccination.	I heartily recommend vaccination; and at early periods of life.
314. **Lord**, C. F. J., (Hampstead), Medical Officer to the Parish.	None whatever.	Certainly not.	No such cases have ever come under my personal observation.	Most undoubtedly.

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315. LONG, JAMES, F.R.C.S., (Liverpool), Surgeon to the Royal Infirmary.	I believe that it produces as great an exemption from smallpox as an attack of scarlet fever does from a second attack; and if smallpox occur after vaccination, it is, in nine tenths of the cases, in a modified form.	I do not suspect or believe anything of the kind. I have heard some old clergymen say so: the statement being obviously founded on prejudice, not on facts.	(a) No. (b) This latter I can scarcely conceive: but having had for many years the charge of a private vaccine establishment, from which all the medical men in this town were supplied, I have often been surprised at the carelessness of those who selected matter. I have often seen them take it from cases which I had rejected.	I recommend that, unless in special cases, which must be very few, vaccination should be performed before teething.
316. LOWDELL, G., (Brighton), Surgeon to Sussex County Hospital.	I am not afraid to speak positively, that vaccination does exempt from smallpox, I should say generally; though I am equally certain that many cases of smallpox occur after the person has been vaccinated in past years. But such cases are almost always of a very mild order, and I do not remember ever to have met with a death among them. If I were to meet with a fatal case of smallpox after vaccination, I should doubt very much whether the vaccine vesicle had properly maturated, and I think much depends on this.	Not if the vaccine lymph has been pure.	I believe that lymph, taken from a pure Jennerian vesicle, has never contaminated the system; and I would almost believe that pure lymph can only produce its like. Yet I have seen very disagreeable eruptions follow upon vaccination; and I am inclined to think that, where such eruptions appear, they are due to a morbid state of the system, awakened, may be, by the little fever naturally attending the latter stage of the vaccine progress. Though I should consider such a person to be duly vaccinated, I cannot but think that lymph taken from such an one may have imbibed some morbific properties; and I should be very sorry to use, for the purpose of vaccination, any lymph so obtained.	I see no reason why vaccination should not be performed during infancy; and I rather advocate a second vaccination after a few years, if for no other reason than to be assured of the efficacy of the first.
317. LUKE, JAS., (London), Senior Surgeon to London Hospital, Past President of the Royal College of Surgeons.	I have not any doubt	I have not.	I have not any personal knowledge of such occurrences.	Yes.
318. LYFORD, H.G., M.D., (Winchester), Surgeon to the County Hospital, Gaol, and Police.	Certainly not.	No.	No.	Yes.
319. MACAULAY, THOS., F.R.C.S., (Leicester), Surgeon to the Infirmary.	None whatever. My experience extends over more than thirty years, and I have never seen a fatal case of smallpox after successful vaccination, nor any case of variolous disorder after such vaccination, when the eruption attained its height later than the fifth day instead of the tenth.	Certainly not. Indeed, I can scarcely suppose this question is put seriously, or, if it be, it can only be with the view of meeting the daring assertions of the most ignorant of mankind.	I have never seen in my own practice, or that of other medical practitioners, anything to create such a suspicion in my mind: and very few men of my standing have had more extended opportunity of observation.	I do. There can be no question upon the subject in the mind of any impartial observer.
320. MACCALL, T.S., M.D., (Greenock), Physician to the Mariners' Asylum.	I have no doubt of this whatever.	My experience bears me out in saying that vaccinated persons do not become more susceptible to other infective diseases.	(a) I have every reason to believe that lymph taken from a party with hereditary disease conveys that disease with it. I never use lymph unless I know the constitution of the child from whom it is taken is free from constitutional disease. (b) I believe the latter must very frequently occur.	Vaccination should always be performed between six and twelve weeks, unless in very special cases.

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321. **Mackenzie, W. M.,** M.D., (Kelso), Physician to the Dispensary.	I have no doubt whatever that such is the fact.	None whatever.	I have a large family, and never inquired for a moment, what was the constitution of the child from whom I vaccinated my own children. I am so fully convinced of the specific action of the vaccine virus, and the impossibility of inoculating the system with any other taint from a true Jennerian vesicle.	I know of no reason which should prevent early vaccination, and I speak from great experience.
322. **Maclagan, David,** M.D., President R.C.S., (Edinburgh), Surgeon to the Queen, in Scotland.	I have no doubt whatever.	I have no reason to believe or suspect that such has been the result, in any case.	I have no reason to believe or suspect that properly conducted vaccination has ever been the parent of any such consequences.	For the sake of humanity, I very earnestly recommend the universal practice of vaccination, at an early period of life.
323. **Mackmurdo, G.,** F.R.S., (London), Surgeon to St. Thomas's Hospital, Consulting Surgeon to the Royal Ophthalmic Hospital.	No.	No.	No.	Yes, certainly.
324. **Macrorie, David,** M.D., (Liverpool), Senior Consulting Physician to the Dispensary and Fever Hospital, and Infirmary of Workhouse.	I have not.	To the first part of this question I would reply in the negative; as to the second, many instances have occurred in which parents have attributed the taking place of anomalous chronic cutaneous eruption to vaccination.	No.	I do; and I am an advocate for a repetition of vaccination (even in those persons where it appeared to have taken a proper course), once in every seven or eight years.
325. **Malden, Jonas,** M.D., (Worcester), Senior Physician to the General Infirmary.	None.	I have not.	I have not.	I do.
326. **Maling, E. H.,** (Sunderland), Surgeon to the General Infirmary.	I have no doubt whatever.	It is my decided opinion, no.	I have not, in 30 years' practice as a vaccinator, seen a single instance of such; nor have I ever heard of a duly qualified person committing the mistake here mentioned.	My opinion is, save these exceptions, that it ought to be performed at an early period of life.
327. **Mallett, George,** F. R. C. S., (Bolton), Honorary Surgeon to the Infirmary and Dispensary.	I have vaccinated two or three thousand children; and my opinion is, that not five per cent. have subsequently been attacked with smallpox; and I know of none that have died from that disease after vaccination.	I do not believe they are more susceptible of any other disease, or that their health is in any other way disadvantageously affected.	My opinion is, that such a result would be impossible. I consider the virus "sui generis," and only capable of producing the vaccine vesicle if the lymph be genuine.	I do; but yet I think the time specified in the present Act too early, to make it imperative; and I would extend the time from three to six months.
328. **Manford, R. A.,** (Inverness), Medical Attendant at Northern Infirmary.	I have no doubt whatever.	I have not, but I confess that my attention had never previously been directed to the points.	After 26 years' experience and observation as a general medical practitioner, I am not aware of any case; but I have always suspected that lymph, taken from a scrofulous subject, might have the effect; and consequently I am always careful to avoid as far as possible, taking lymph from any person supposed to have any infective disease.	I do, most certainly.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
29. Marnock, G. F., M.D., (Bury St. Edmund's), Physician to Suffolk General Hospital.	I have no doubt, but have great faith in its exemption.	I do not consider that persons become more susceptible of any disease after vaccination.	Having had charge of an Institution in Edinburgh (for the diseases of women and children), where vaccination was duly performed for a number of years, I have seen many cases of syphilitic disease following vaccination; but cannot speak confidently of appearance of diseased child in its vesicular stage.	I consider the proper period to be between the third and fourth months; earlier than that only produces more constitutional disturbances.
30. Marson, J. F., (London,) Surgeon to the Smallpox and Vaccination Hospital. [See Appendix, F. & G. and Supplement, p. 137.]	I have no doubt whatever that vaccination, when well performed, confers on persons who have been subjected to its influence a very large exemption from attacks of smallpox, and almost absolute security against death from this disease.	I have no reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis, or that their health is in any other way disadvantageously affected.	I have no reason to believe or suspect, that lymph from a true Jennerian vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccine disease, has occurred in the hands of a duly educated medical practitioner. I answer on this point from the experience of having vaccinated upwards of 40,000 persons.	I recommend that vaccination should be universally performed, on children in good health, during the fourth month of age.
31. Martin, Edw., (Bristol), Senior Surgeon Accoucheur to the Dispensary.	No doubt whatever.	I have not. (*See* answer to next question.)	(*a.*) I believe it is sometimes the vehicle of communicating the syphilitic taint to children previously perfectly free from it. I do not think that it does any other. (*b.*) I have never seen anything of the kind. I have, on many occasions, been called to cases of eruption, markedly syphilitic, occurring after vaccination, and in which I have failed to detect the slightest taint in either parent, or in the other children of the same marriage. But, if the lymph be selected from children healthy in themselves and having healthy parents, I believe it, with ordinary care in the management of the pustule, to be quite free from risk.	Undoubtedly. I always perform it, where practicable, before the commencement of dental irritation. *
2. Martin, J. R., F.R.S., (London), late Surgeon to the Bengal Army.	I have no doubts on the two questions.	No.	I have never seen any such instances.	I do.
3. Martin, Peter, Reigate).	I have no doubt. In twenty-three years' practice I have never seen a fatal case of smallpox after vaccination.	I have no reason to believe or suspect that the health of vaccinated persons is in any way disadvantageously affected.	None whatever.	Most decidedly.
. Masfin, W. E., M.B., Stafford,) Surgeon to e Staffordshire General nfirmary.	Not the slightest.	Not the least.	(*a*) I have no reason to believe that it ever has, but I would not pledge myself that syphilis *could* not be communicated in this way, though I do not think it likely. (*b*) This I should think hardly possible.	I think the age most suitable would be between two and six months.

I have had a good deal to do with vaccination for the last thirteen years, and for some time (as Assistant to the Poor Law Officer) had the whole public vaccination of St. Margaret's St. John's, Westminster, under my care. I have seen the deaths of two children from vaccination. Both were unhealthy subjects; and, in both, the crust was rubbed off before me: this being followed by ulcerative, and ultimately an approach to gangrenous action: the children sinking before gangrene was completely set up. E. M.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
335. Mathias, A., (Bridgnorth), Surgeon to the Infirmary and Dispensary.	My experience goes to prove that the exceptions are very few in which smallpox occurs after vaccination; perhaps no more frequently than smallpox occurring a second time in the same. I have known death from a second attack of smallpox, but never after vaccination.	None in the least.	(a) None. (b) I have heard of such cases, but cannot vouch for the fact.	I do, and should say from three to five months is the best period.
336. Maurice, T. B., F.R.C.S., (Reading), Surgeon Royal Berkshire Hospital, &c.	None whatever.	Certainly not.	No, neither do I believe unintentional inoculation has occurred in proper hands.	I am of opinion that vaccination should generally be performed within three months of age.
337. May, George, F.R.C.S., (Reading), Consulting Surgeon to the Royal Berks Hospital.	No.	No.	No.	Yes.
338. Mayo, C., F.R.C.S., (Winchester), Senior Surgeon, County Hospital.	No, especially when vaccination has been repeated at suitable intervals.	No, but I have seen many instances of smallpox a second time.	No, but I have witnessed unpleasant symptoms and irritation, arising either from matter taken too late, or accidental interference with the vesicle, perhaps in strumous children.	Yes, but I think that the age of six calendar months is early enough, unless there was especial danger of infection from smallpox.
339. Mayou, J., (Monmouth), Senior Surgeon to the Dispensary.	Forty years' experience convinces me that vaccination, if properly performed, is a most valuable preventive against smallpox; and the cause of its disrepute has arisen from its having been performed by ignorant and non-medical persons, particularly the clergy.	Certainly not.	No, but frequently a secondary eruption succeeds, in gross and strumous constitutions.	I have invariably vaccinated early, and repeated it after the child has had those diseases incidental to childhood
340. M'Carogher, Joseph, M.D., (Chichester), Senior Physician to the Infirmary.	None whatever.	I have never observed, nor do I believe, a vaccinated person becomes more susceptible to phthisis or any other infective disease, or that the general health is in any way disadvantageously affected.	None whatever.	I do, provided the skin is free from eruptions.
341. M'Clintock, A. H., M.D., (Dublin), Master of the Lying-in Hospital, and formerly Assistant at the Cowpock Institution, Dublin.	I entertain no doubts upon this point.	I have no reason to believe that vaccinated persons are in the slightest degree more susceptible of phthisis, or of any infective disease. If the recipient be healthy at the time of vaccination, and if the lymph be taken from a good source, and the vesicle, or areola, not rubbed or abraded during its progress, I do not believe that any unpleasant effect will arise from vaccine inoculation.	I have never seen an instance that would justify such a suspicion.	Yes, the best period being, I think, just before the first dentition.
342. McMunn, James, (Wolverhampton), Surgeon to the South Staffordshire Hospital and Dispensary.	I have not the slightest.	I do not believe that disease of any kind can arise from vaccination.	(a) I have not. (b) I have never known an instance of this kind.	I do, strictly and conscientiously. *

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* In March, 1852, I vaccinated a child with healthy lymph, and it was successful. About three weeks after, the mother of the child was seized with confluent smallpox; and a more severe case I never attended. During the mother's illness, which continued for four weeks, I gave strict directions that the child should be kept to the breast, which were duly observed. During that time the child grew and improved daily, and never seemed in the least to suffer from the mother's illness, although sucking the matter off the pustules around the nipples. *This case alone* points out the great efficacy and value of vaccination. P.S.—The mother of the child had never been vaccinated. The child is as strong and healthy as possible. J.MM.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
343. McWilliam, J. O., M.D., F.R.S. (London).	I have no doubt whatever.	None.	None.	Yes. *
344. Meric, Victor de, M.D., (London), Surgeon to the Royal Free Hospital, and to the German Hospital, Dalston.	I have no doubt on this subject.	I have no reason to suspect such indirect consequences of vaccination. In most of the cases of infective disease, or phthisis, I have had to treat, I have been able to trace their origin to direct contagion or hereditary taint.	Children suffering from syphilis generally present the secondary form, descending upon them hereditarily. I do not believe that secondary symptoms can be transmitted by inoculation; hence (if I am right in holding Hunter's and Ricord's opinion on this non-transmissibility) *it is impossible* to convey syphilis by vaccination, except the lancet (by a guilty negligence) have come in contact with pus, secreted by a *primary ulcer.* I may state, besides, that no case of the kind has ever come to my knowledge, except one in Germany, which was extremely obscure.	Yes.
345. Merriman, John, (Kensington), Apothecary Extraordinary to the Queen.	No doubt at all.	Certainly not.	(*a*) No. (*b*) I never heard of it.	Decidedly, I do.
346. Michell, S., (Truro), Surgeon to the Royal Cornwall Infirmary.	I have no doubt that vaccination confers on persons on whom it has been successfully performed, a large exemption from smallpox. But, in my practice, I have witnessed a great number of cases of smallpox after successful vaccination, which, with few exceptions, were mild and extremely modified, the disease running its course in seven or eight days. The few exceptions were severe cases, assuming the character of natural smallpox, and one (the only case I have ever seen) terminated fatally.	No.	(*a*) I have no reason to suspect, but think it just possible, that the matter from a true Jennerian vesicle may have been the vehicle of constitutional infection; and therefore the greatest care should be exercised in selecting a healthy child to vaccinate from. (*b*) I do not think it probable that any properly educated medical practitioner, exercising due care, could mistake a true Jennerian vesicle.	I do.
347. Middleton, W., F.R.C.S., (Leamington), Senior Surgeon, Warneford Hospital.	What man can have doubt?	Decidedly not.	No.	I always vaccinate a child in the third or fourth month after birth.
348. Miller, Jas., F.R.C.S., Professor of Surgery in the University of Edinburgh, Surgeon to the Queen in Scotland.	No doubt.	No reason.	No.	Yes.
349. Minshull, J. L., F.R.C.S., (Liverpool,) Consulting Surgeon to the Dispensary, &c.	I have not the slightest doubt upon the subject. If successfully performed, when permitted, I frequently vaccinate in a few days, as a test.	I do not think any person is more susceptible of any other infective disease by the introduction of genuine vaccine virus.	Thirty years ago, I was one of the two public vaccinators in Liverpool; and I have vaccinated upwards of one hundred in a morning, without meeting, even to the present day, any syphilitic or scrofulous infection from vaccination.	If a choice of time be afforded, I should prefer not under three months.

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* My opinions, as expressed in the foregoing answers, are the result of 34 years experience in the profession:—as an apprentice to a medical man in extensive practice in Scotland; as an assistant to a practitioner also in large practice in the county of Northumberland; and as a medical officer in the Navy, in which I have visited most parts of the world, and have had much intercourse with medical men of all countries, and ample opportunities of ascertaining their views regarding vaccination.

In one instance only, during my life, have I met with a medical man who advocated the performance of variolous inoculation. This occurred at the Cape de Verde, in 1846, when a Portuguese surgeon produced, in a young girl, a perfect case of confluent small-pox by inoculation. When I left the island the girl was, to all appearance, dying.

I have vaccinated great numbers of Blacks in the interior of Africa. I was to the best of my knowledge the first to introduce vaccination among the natives on the banks of the Niger, where I taught some of the chiefs how to perform the operation. In doing this, and in extending vaccination wherever I could, I have considered myself as conferring a benefit upon my fellow-creatures, civilized as well as uncivilized. Some remarks on Vaccination among Negroes are to be found at pp. 246, 7, 8, and 9, of "Medical History of the Niger Expedition," by myself. I am at present engaged in the re-vaccination of the Custom-House Officers,—a force of between 1200 and 1300 men. J. O. McW.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
350. **MOIR, JOHN**, M.D., (Edinburgh), Physician to the Royal Maternity Hospital.	I have not.	I have not any.	As far as I can judge from the results of my own practice, I have no reason to believe in any such secondary infection. I have heard of such supposed cases, but never saw them.	I do.
351. **MONTGOMERY, W.F.**, M.D., (Dublin), President of King and Queen's College of Physicians, Ireland.	I think it affords very considerable protection; which however, diminishes with time; but I cannot assent to the "almost absolute security" against death from smallpox.	I have no reason to think so.	I never saw such a result.	I think it ought; and about the third month I think the best time.
352. **MORDEY, W**, (Sunderland), Senior Surgeon to the Infirmary.	I have no doubt on the subject; as I have not had six cases (in a large practice during thirty years) of smallpox after vaccination.	On the contrary, for I have often observed children thrive better after vaccination.	I have had one case where the lymph sent me by a medical friend, who is a public vaccinator certainly did produce a syphilitic taint; therefore I think public vaccinators ought to be very careful in vaccinating children unknown to them.	I certainly do recommend that vaccination should be universally performed at early periods of life; and I have been in the habit of re-vaccinating the children of the better class again, at or about the age of 12 or 14 years, where, in almost every instance, a bastard vesicle is produced. I consider this a good test of the first vaccination.
353. **MOREAU**, M. D., (Paris), Professor of Midwifery to the Faculty, Member of the Academy, Officer of the Legion of Honour.	Oui:—je n'ai aucune doute sur la réalité de cette immunité.	Non; la vaccine n'augmente pas la disposition à prendre d'autres maladies.	Quand on inocule de la lymphe vraiement vaccinale on ne produit que la vaccine, quelque soit d'ailleurs l'état de santé ou de maladie du sujet qui la fournit. Pour produire la syphilis il faudrait inoculer du pus venant d'un chancre vénérien, et non d'une pustule vaccinale.	Oui: si on vent soustraire les populations aux funestes effets de la variole, les gouvernements doivent tout faire pour rendre la pratique de la vaccine universelle.
354. **MORGAN, CAMPBELL** De, F.R.C.S., (London), Surgeon to the Middlesex Hospital.	I have no doubt at all as to the exemption from smallpox of a large proportion of those properly vaccinated. I am not in a position to give an opinion as to the security against death.	There seems to me no reason for such a belief. The average of life is higher now than before vaccination was introduced; and the better classes, who for the most part are vaccinated, do not appear more susceptible of infective disease, or of phthisis, than the lower, who are often unvaccinated. Of course there are other reasons; but these I believe to be the fact.	None whatever, if the vaccination be carefully performed.	Most decidedly.
355. **MORGAN, W. F.**, F.R.C.S., (Bristol), Consulting Surgeon to the Royal Infirmary.	No.	No.	No.	Yes.
356. **MORRIS, I.**, (Hereford), Surgeon to the General Infirmary.	I have no doubt.	I have no reason to believe or suspect anything of the kind.	I have not.	I do.
357. **NAIRNE, R.**, M.D., (London), lately Physician to Saint George's Hospital.	I have no doubt that successful vaccination confers, on persons subject to the influence, a very large exemption from attacks of smallpox, and almost absolute security against death by that disease.	No; there is no evidence in favor of such an assertion.	I have never had any proof in favor of such an opinion. I do not therefore believe that the true Jennerian vesicle has been the vehicle of syphilis, or other constitutional malady.	I would most earnestly recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
358. **Nash, James, M.D., (Worcester), Physician to the Dispensary.**	None whatever.	Certainly not.	I know of no instance of the kind. I think it highly improbable; though there is much prejudice upon this point.	Yes.
359. **Neligan, J.M., M.D., Dublin), late Physician to the Jervis Street Hospital.**	I have no doubt that successful vaccination is in most cases a certain preventive against smallpox; and to a great extent affords security against death by that disease.	I do not believe that they are more liable to any other disease, or that the constitution is in any respect injured thereby.	(a) I have not any reason to believe so. (b) I do not think it at all likely to occur.	I am most decidedly of this opinion.
360. **Nicholas, F. T., (Bodmin), Surgeon to the East Cornwall Hospital.**	No.	To the first part of the question, I answer No. To the second I reply, that I have seen reason to believe, that where a scrofulous taint exists, the vaccine poison will frequently call it into action.	I believe that lymph from a true vesicle (being not mixed with globules of blood) cannot be a vehicle of infection; hence I think that the greatest caution is needed on the part of the operator who takes the lymph.	I am of opinion that vaccination, except when smallpox is epidemic, should be deferred until a child completes his first year; and that, except in the above case, it should never be performed in the months from November to April, both inclusive.
361. **Nicholson, John, (Hexham), Surgeon to the Dispensary.**	No.	No.	No.	Yes.
362. **Noble, Daniel, M.D. (Manchester), formerly one of the Public Vaccinators for the Township of Manchester.**	I have no doubt whatever.	Certainly not.	Having had a very extensive experience bearing upon this matter, I must reply very decidedly in the negative.	I do, most emphatically.
363. **Norman, Geo., F.R.C.S., (Bath), Senior Surgeon to the United Hospital, and Surgeon to the Puerperal Charity.**	After a practice of 50 years, I can say I have no doubt. During that period, I have seen several cases of secondary smallpox after vaccination; but almost all the cases were mild. I have seen not more than three or four severe cases, and only one death; and in that case the previous vaccination was doubtful. In the same time I have seen two cases of death from smallpox the second time; in both cases the previous natural smallpox was unquestionable.	I have no reason so to believe.	(a) I have never had the slightest reason to think that syphilis, or scrofula, ever had any origin in vaccination; nor do I think it possible. (b) The latter contingency I can hardly contemplate.	I do.
364. **Nunn, Roger S., (Colchester), Surgeon to the Essex and Colchester Hospital.**	None whatever.	No.	(a) No. (b) The case must be very exceptional.	The earlier the better; inasmuch as, if it be put off to a later period, the ailments of teething are attributed to it.
365. **Nussey, John, (London), Apothecary in Ordinary to the Queen and Prince Albert.**	I have been more than 40 years in practice, and have seen many cases of smallpox after vaccination; but no fatal cases.	I have never had the slightest reason for believing any such thing.	(a) To the first, I answer as above. (b) To the second, no such instance has ever fallen under my notice.	I think a fashion is growing up of having infants vaccinated much too early in life, namely, within the first month.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
366. **Ogilvy, James**, M.D., (Coventry), Surgeon to Coventry and Warwickshire Hospital.	Yes; however, I have met with one death from smallpox after vaccination.	No; not according to my experience.	No. It is, however, a commonly received opinion among the lower orders here, that bad matter is the fruitful cause of many disorders; and hence the repugnance of many to vaccination. I have myself frequently seen cases, carefully vaccinated with good virus, followed by an eruption, often persistent, of a pustular or vesicular character.	Yes.
367. **Oke, W. S.**, M.D., (Southampton), Senior Physician to the Royal South Hants Infirmary.	None whatever.	I have not.	(*a*) I have not; at any rate, I have never seen such a result from the true vaccine vesicle. (*b*) Nor do I believe that unintentional inoculation with some other disease, instead of the proposed vaccination, has ever occurred in the hands of a duly qualified practitioner.	I do, decidedly.
368. **Oppolzer, J.**, M.D., (Vienna), Professor of Medicine.	Vaccination protects in most cases against smallpox, and (as a rule) at all events against a fatal termination of that disease.	No one by being vaccinated incurs a greater liability to typhoid fever and other zymotic diseases, or to scrofula and phthisis.	Syphilis can, of course, be communicated by inoculation from a genuine *syphilitic* vesicle; but it is not to be presumed of an educated surgeon that he could be mistaken in this respect. No one can talk of communicating scrofula or other constitutional diseases by inoculation.	Assuming that all needful means have been taken to ensure its proper performance, and excepting cases in which there may be special reasons to the contrary, the general vaccination of children is to be recommended.
369. **Ord, George**, F.R.C.S., (Brixton).	I have no doubt that such is the result of successful vaccination.	I have never observed any case which would lead me to form such conclusions.	(*a*) In no case have I been led to suspect that any of the diseases mentioned have been communicated by the medium of lymph from a true Jennerian vesicle. (*b*) I have never seen such accidental inoculation.	Most decidedly. I have been in the habit of vaccinating healthy children at the age of three months; delicate children at the age of four to five months.
370. **Ormerod, E. L.**, M.D., (Brighton), Physician Sussex County Hospital and St. Mary's Hall.	None whatever.	As far as my own experience goes, not the slightest; though I am quite aware that the contrary is stated on high authority. But, from the nature of the question, I feel that I cannot answer as positively to this as to the other inquiries.	I have never seen an instance of such infection. I have seen more than one reputed instance; but have always found the opinion erroneous, on careful inquiry.	I do.
371. **Outhwaite, John**, M.D., (York), Consulting Physician to Bradford Infirmary.	According to my experience, vaccination confers a large exemption from attacks of smallpox; but by no means security from death by that disease.	I have no reason to think anything of the kind.	I cannot suppose anything of this nature.	I strongly recommend early vaccination.
372. **Overend, Wilson**, F.R.C.S., (Sheffield), Honorary Surgeon to General Infirmary.	No.	No.	No.	Yes.
373. **Page, W. B.**, (Carlisle), Surgeon to the Cumberland Infirmary and the County Gaol.	No; "almost absolute security" is perhaps rather a stronger term than I should have employed.	No.	I have never seen any such result.	I do.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
374. **Paget, G. E.**, M.D., (Cambridge), Physician to Addenbrooke's Hospital.	I have no doubt whatever.	No.	(*a*) Cases now and then come under my notice, in which general health, or scrofulous disease, is stated by the friends of the patient to have shown itself soon after vaccination; and is attributed by them, either simply to vaccination, or to the (similarly) unhealthy condition of the individual from whom the vaccine lymph was derived. I have never been able to obtain satisfactory evidence, as to whether either of these notions was well founded. (*b*) The second of the suppositions is less improbable than the first; and I should think it a reasonable and proper precaution, that the lymph for vaccination should be taken exclusively from individuals of good constitution.	Yes; but I do not think it advisable to render it compulsory (even in healthy children) so early as within the first three months.
375. **Paget, Jas.**, F.R.S., (London), Assistant Surgeon to St. Bartholomew's Hospital, lately Professor of Surgery to the Royal College of Surgeons.	No.	No. (*See* Supplement, Page 138.)	No.	Yes.
376. **Paget, T.**, F.R.C.S., (Leicester), Surgeon to the Infirmary.	The notorious diminution of smallpox settles, incontestably, the first part of this question. Upon the second, I have to say that I have never seen death occur; but have witnessed very severe cases of smallpox after vaccination, when the operation had been done more than 20 years, and its influence may be supposed to have been worn out	I think such a suspicion wholly unsupported by fact, and disgracefully illogical.	No.	Universally: at from six to twelve weeks of age, and again soon after fifteen years. I have seen many, after this age, form normal vaccine vesicles, matured in eight days, in whom satisfactory marks of previous vaccination were present; and from such a vesicle have vaccinated, satisfactorily, a child of my own, in whom, now grown up (21), I have as yet failed, on trial, to produce an effect, for more than three or four days.
377. **Paley, W.**, M.D., (Peterborough,) Physician to the Infirmary and Dispensary.	I have no doubt that vaccination prevents the attack of smallpox, in a large number of persons; and that those who do take it afterwards have the disease in a very mitigated form, which is very rarely fatal. Out of 125 cases noted by myself, 62 were vaccinated previously; only one died. 50 cases were not vaccinated; and 15, or one in three, died. 13 cases not known, one died.	Most certainly not.	Most certainly not.	I do.
378. **Parke, E.**, (Liverpool), Surgeon to the Ladies Charity, and to the West Derby Dispensary.	None whatever.	No.	No: but I have frequently seen very troublesome eruptions produced after vaccination with good lymph, which, applied to other children at the same time, has not been attended with any unpleasant results.	Yes.

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379. Parker, J. C., (Bridgwater), Senior Surgeon to the Infirmary.	I have no doubt whatever.	I have no reason to believe anything of the kind.	I have had a very large experience, having had the medical care of extensive country parishes, &c. for upwards of thirty years, as well as having been surgeon of an hospital twenty years and upwards; and I never saw the true Jennerian vesicle a vehicle for the production of any serious disease whatever. I find occasionally eczema, or skin diseases of no importance, may follow vaccination; but I consider that operation ought to be performed generally, with a few exceptions, and I think it the greatest blessing ever bestowed on mankind.	(*See foregoing column.*)
380. Parker, Langston, (Birmingham), Surgeon to the Queen's Hospital.	I have no doubt.	I have no reason to believe or suspect that vaccination renders persons more susceptible of other infective diseases, or of phthisis, or that health is otherwise affected by it.	(*a*) For 20 years I have seen a great amount of secondary syphilis; and I never saw a case where constitutional infection had been conveyed through the medium of a true Jennerian vaccine vesicle. (*b*) I think not.	Most certainly, I do.
381. Parker, T. P., M.D., (Sunderland), Surgeon to the Infirmary.	I have no doubt that it has, and will produce all required from it, if it should become universal.	To the former part of the question—No. The health may be, and occasionally is, temporarily affected by cutaneous eruptions and inflammations, occurring in strumous children after vaccination.	Every suspected case that has occurred to me has, upon minute investigation, been readily explained by the existence of other causes.	I do; and it should be repeated at least three times during life.
382. Parkes, E. A., M. D., (London), Physician to University College Hospital.	No.	No.	No.	Yes.
383. Partridge, J. H., (Colchester), Senior Surgeon to the Hospital.	I have no doubt that it confers on persons subject to its influence a very large exemption from attacks of smallpox; and death after it I think very rare.	I never saw a single instance of the kind; nor do I believe their health is in any way affected by it.	(*a*) Scrofulous, never: syphilitic, in the hands of a duly educated medical man, scarcely possible. (*b*) I believe never.	I do, most decidedly.
384. Peacock, T. B., M.D., (London), Physician to the City of London Hospital for Diseases of the Chest, Assistant Physician to St. Thomas's Hospital.	None whatever. Every practitioner of much experience has seen cases of variola after vaccination prove fatal; but such cases are certainly very rare; and in most instances, when death ensues after vaccination, it may be doubted whether the operation has been satisfactorily performed.	None whatever.	None whatever.	I have no hesitation in expressing my opinion, that the performance of vaccination in early life should be made compulsory, "except for special reasons in individual cases."
385. Pearse, Edmund, (London).	None whatever.	I neither believe nor suspect either of these.	I have never had reason to believe, nor do I suspect that such evils have ever resulted from the insertion of lymph from a true Jennerian vesicle.	I do; but I think it would be preferable to fix the limit at six months, instead of three.

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386. **Pemberton**, O., (Birmingham), Surgeon to the General Hospital.	I have no doubt.	I have not.	I have not.	I do.
387. **Pendlebury**, J., (Bolton), Honorary Surgeon to the Dispensary.	Not any doubt.	No.	Yes; I have reason to suspect.	Yes.
388. **Perry, John**, F.R.C.S., (London), late Surgeon to Chelsea, Brompton, and Belgrave Dispensary.	None whatever; although I have discovered that smallpox does not exempt the patient from a concurrence of the disease and that of the confluent form, when the previous attack had left on the face too evident marks of its severity.	Certainly not.	Not in my experience.	I do.
389. ? (Peterborough).	No.	No.	No.	Yes.
390. **Phillips**, E., M.D., (Winchester), Physician to the County Hospital.	None whatever.	Not the slightest.	I have never met with or heard of such a case.	Yes. But I am inclined to think that a repetition, at different after-periods of life, is desirable, as a test of permanent security.
391. **Pinching**, R. L., (Walthamstow), Surgeon to the Infant Orphan Asylum, Wanstead.	No.	No. (*See* Supplement, p. 152.)	No.	Always.
392. **Pollard**, J., (Torquay), Surgeon to the Dispensary.	Not the least doubt.	No.	No.	Yes, most certainly.
393. **Porter**, W. H., M. D., (Dublin), Professor of Surgery in the Royal College of Surgeons, Ireland.	I have no doubt whatever of the truth of this position.	Certainly not more susceptible of infective disease, or of phthisis. I think I have seen certain scrofulous affections rendered more active, by the constitutional irritation attendant on the vaccine inflammation; but not more than might be expected from an equal irritation produced by any other cause.	I hold the first part of this question to be impossible; and the last part very unlikely. I have never heard of either from an authentic source.	I do, strongly; and have had the operation so performed on my own children.
394. **Price**, W., F.R.C.S., (Leeds), Surgeon to Police Force and Borough Gaol.	No.	No.	(*a*) No. (*b*) I am quite sure that, in numerous instances, the vaccine vesicle has not the appearance that it had in my younger days, say more than 40 years ago, when I visited the vaccine institutions in London; that is to say, sufficient care is not taken, in many instances, to produce a perfect pock, by taking the lymph at a proper time; viz., when clean, pellucid, and the red circle slight; but deferring a day *or more*, the circle being then diffused, and the lymph become opaque. Inflammation and ulceration often succeed, and much time and trouble are taken before the little patient is well; yet these operators call this "*vaccination!*"	Most certainly.

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395. **Prichard, A.**, M.D., (Clifton), Surgeon to the Bristol Royal Infirmary.	I have no doubt whatever on this point.	No.	I have known many instances of eruptions, and disordered general health, following vaccination. I have always referred these facts to the irritation of the vaccination producing disorder in weakly children. I never had any reason to suppose that these conditions were produced by unintentional inoculation of morbid matter.	Yes.
396. **Prichard, J.**, F.R.C.S., (Leamington), Surgeon to the Warneford Hospital.	I have no doubt of these results.	I believe that no such consequences attach to vaccination.	No: I believe that the frequent subsequent occurrence of *eczema infantile* has led to the erroneous impression, that the previous vaccination has acted as a cause of the eruptive attack. I do not think, however, that sufficient caution is observed, either in rejecting an imperfect vesicle as a medium of vaccination, or in the condition of the infant to be vaccinated.	I do.
397. **Probart, F. G.**, M.D., (Bury St. Edmund's), Senior Physician to the Suffolk Hospital.	On the contrary, I have the fullest reliance, founded upon many years' experience, that it effects both these results.	I have not.	Such has never occurred in my experience, nor do I know any member of the profession who advocates either of these opinions; which, however, are common enough among the vulgar and uneducated.	I do most conscientiously think so.
399. **Quain, R.**, M.D., (London), Physician to the Hospital for Consumption at Brompton.	I have not the slightest doubt on either point.	I have no reason to believe anything of the kind. In reference to phthisis, I would more especially observe, that the disease prevailed extensively in this country before the discovery of vaccination: that it occurs in many of the lower animals; and finally, as the result of a special inquiry, I find that about 30 per cent., or rather more, of the patients in a public hospital suffering from phthisis, show no marks of vaccination.	No. I believe that with ordinary care no case of the kind could occur.	Certainly: for thus, smallpox, if not exterminated, would be reduced to a minimum of intensity and frequency.
400. **Ranking, W. H.**, M.D., (Norwich), Physician to the Norfolk and Norwich Hospital.	None whatever; on the contrary, a conviction amounting almost to certainty.	None.	None. The notion has, I believe, arisen out of the anxiety in parents to attribute the diseased constitution of their offspring to anything rather than its true cause, their own depraved habit of body.	I recommend primary vaccination in infancy, and revaccination at a period of seve years, once or twice repeated
401. **Ransom, W. H.**, M.D., (Nottingham), Physician to the General Hospital.	No.	No.	No.	Yes.

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402. **Rayer**, M.D., (Paris), Physician to the Hospital la Charité, Member of the Institute and of the Academy of Medicine, President of the Comité Consultatif d'Hygiène Publique en France, and Perpetual President of the Société de Biologie.	Non; je n'ai point de doutes à cet égard. Hors les temps d'épidémie, il est rare que la variole se déclare sur des sujets vaccinés. En temps d'épidémie de variole, les exemples d'affections varioleuses chez les vaccinés ne sont pas rares. Un grand nombre d'épidémies observées en France et dans les pays étrangers ont mis ce fait hors de doute. On l'a particulièrement constaté dans les épidémies de Montpellier (1816); de Milhau (1817); de la Martinique (1818); de Ceret (1821); de Paris (1825); de Beaucaire (1825); du Bas-Rhin (1825 et 1826); de Mont de Marsau (1826); de St. Paul de Léon (1826); de Saumur (1827); de Marseille, de Digue, et de Riez (1828); de Beaugency (1832); de Strasbourg (1833); de Paris (1834); de l'arrondissement de Montauban (1838 et 1839); de Mantes (1839); de Chalais (1840); de Castelnau (1840); de Paris (1836 à 1841); de Strasbourg (1839 et 1840). Dans ces épidémies, on a observé un assez grand nombre de *varioles modifiées* et même quelques cas de variole légitime. Mais chez les individus vaccinés infectés du contagion variolique, la mortalité a été nulle dans plusieurs des épidémies, et très exceptionelle dans les autres: Un calcul fait par M. Bousquet, membre de l'Académie de Médecine, montre que dans ces épidémies le nombre des individus non vaccinés atteints de variole a été de 10,439, *dont* 1692 *sont morte;* tandis que celui des vaccinés infectés par le contagion variolique n'a été que de 6071, dont 63 seulement sont morte; résultat favorable à la pratique de la vaccine, puisque la mortalité n'a été que d'un 96me environ, pour les vaccinés, tandis qu'elle a été d'un 6me et une fraction pour les individus non-vaccinés. Il est également démontré que parmi les sujets vaccinés le contagion variolique a attaqué surtout ceux dont la vaccination remontait à une époque éloignée; circonstance qui m'a confirmé dans l'opinion, que j'ai émise depuis longtemps, qu'en temps d'épidemie variolique il est indispensable de soumettre à une revaccination les sujets vaccinés.	Il est vrai que dans les derniers temps quelques personnes ont émis l'opinion que depuis la pratique de la vaccine en France, les proportions de la mortalité entre les âges avaient changé; que la mortalité, faible autrefois dans les âges de virilité, s'était accrue dans cette période de la vie. Mais une application intelligente de la statistique a démontré que cette assertion était inexacte. On a avancé, et sans plus de fondement, que, depuis la vaccination, les fièvres graves, et en particulier la fièvre typhoide, étaient devenues plus fréquentes. Quant à l'opinion que la fièvre typhoide est une variole intestinale, elle est en opposition avec tous ce que l'on sait de la nature de ces deux maladies. Pour moi, il n'est nullement démontré non plus que la vaccine ait rendu la phthisie et les scrofules plus fréquentes en France.	Dans une très longue pratique je n'ai point observé d'exemple de syphilis transmise par la vaccination. Les cas très rares de transmission qu'on a cités ne me paraissent pas concluants. Quant aux scrofules et aux dartres, je ne sache pas qu'il éxiste de faits qui tendent à démontrer leur transmission par la vaccination.	Au point de vue de l'hygiène publique, je pense qu'il serait de la plus grande utilité, de rendre la vaccination *universelle et obligatoire.* En temps ordinaire, la variole se développant rarement chez les enfants nouveau-nés, je pense que la vaccination doit être pratiqué du premier au deuxième mois. Mais, s'il éxiste une épidémie grave de variole, la vaccination ne doit pas être ajournée.

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403. **Rayner, J.**, F.R.C.S., (Stockport), Surgeon to the Stockport Infirmary.	No.	No.	No.	Yes.
404. **Reedal, G.**, (Sheffield).	Not the least doubt of it.	I do not believe that they become more susceptible of any infectious disease, or that their general health is in any way deteriorated, but to the contrary.	(*a*) The first part of the query I think is very difficult to answer, whether any specific disease can or not be communicated by vaccination. (*b*) The latter part of the sentence: I have never heard of such.	Yes, I do. Query, whether twelve weeks, as at present enforced, is not too early?
405. **Richardson, D.**, (Brighton), Public Vaccinator to the Western Division of Brighton.	During a practice of 30 years, I have anxiously watched to detect a case of death from smallpox after vaccination; but have seen none, though I have seen numerous cases of smallpox after vaccination. Vaccination always renders the smallpox mild, and, as far as I have seen, harmless. But in far the greater number of cases vaccination prevents smallpox altogether.	As the vaccine vesicle does suppurate, but protects the constitution from a suppurative disease, so it leaves the constitution less liable to a suppurative disease than if it had suffered from smallpox.	I never knew vaccine produce anything else; and I do not believe that it can. I have known a patient vaccinated with matter taken from an individual who was suffering at the same time from another disease, viz., the ordinary unmodified smallpox: the vaccine from such diseased person, however, produced the cowpock only.	I believe that vaccination properly carried out would annihilate the smallpox.
406. **Ricord**, M.D., (Paris), Surgeon to the Hôpital du Midi, Member of the Imperial Academy of Medicine, &c. &c.	Non.	Non.	Non, non.	Oui.
406a. **Rigby, E.**, M.D., (London), Senior Physician to the General Lying-in Hospital.	No.	No.	No.	I do.
407. **Robbs, W.**, M.D., (Grantham), Physician and Surgeon to the Union Workhouse and Fever Hospital.	I have no doubt whatever that vaccination, when properly taken, is the greatest possible security against smallpox.	I do not, speaking from my own experience, of 25 years of active general practice, believe that persons are made more susceptible to infectious diseases for having been vaccinated; or that, in any other way, their health is disadvantageously affected.	No.	I am of opinion that, in all cases, when there are no special reasons for delay, children should be vaccinated between the third and sixth month.
408. **Robertson, A.**, M.D., F.R.S., (Northampton), Physician to the General Infirmary.	I have no doubt whatever.	I have no reason to believe or suspect that vaccination, in preventing smallpox renders persons more susceptible of other infective diseases, or of phthisis; nor do I believe that the health is disadvantageously affected, in any other way, by vaccination.	I have never seen any reason to believe or suspect that syphilis has been introduced into the system by vaccination as its vehicle. Nor do I believe that scrofula or other constitutional infection has ever been so imparted to vaccinated persons. I have never met with any instance of unintentional inoculation.	I do strongly reommend it.
409. **Roberton, John**, (Manchester), Author of a Treatise "On the Mortality and Physical Management of Children."	I do not think that more than one in twenty (5 per cent.) of the vaccinated is liable to smallpox; and, in my own practice, I remember only one fatal case of the disease in a person who had been vaccinated.	No; of course more children die of measles, scarlet fever, and the like, now, than prior to the Jennerian discovery, because smallpox then carried off so many children, that few were left as the prey of other diseases.	I have no reason to believe or suspect any such thing.	As all persons of sense and education at the present time willingly have their children vaccinated, I would compel those who neglect vaccination to conform to the law.
410. **Robinson, B.**, M.D., (Rotherham), Surgeon to the Dispensary.	I have not the slightest doubt as to its great advantage, in exempting persons from smallpox, where properly performed.	I believe it does not render persons more susceptible of disease; nor does it in any way affect the health disadvantageously.	I have never observed any such effects.	Yes; most strongly.

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411. Robinson, G., D.M., (Newcastle-on-Tyne), Physician to the Dispensary and Fever Hospital.	None; as regards general exemption from, and mitigation of, attacks of smallpox.	No.	No.	I do.
412. Rostan, M. D., (Paris), Professor of Clinical Medicine to the Faculty, Member of the Academy, Officer of the Legion of Honor.	Je partage complètement l'opinion que les individus vaccinés sont pour la plupart à l'abri de la petite-vérole, et qu'alors même qu'ils contractent cette maladie ils succombent fort rarement. Il n'est pas inutile de dire que cette conviction s'est formée dans les circonstances les plus favorables. J'ai été attaché pendant dix-huit ans en qualité de médecin des pauvres, dans le 12me arrondissement de Paris, le plus pauvre et le plus populeux de cette ville. Je faisais toutes les semaines environ 100 vaccinations—cinq mille par an, à peu près 80 à 90,000 pour ce laps de temps—sans compter ma clientèle de la ville.	J'ai la ferme conviction que la vaccination en diminuant d'une part la susceptibilité à prendre la petite-vérole n'augmente nullement de l'autre la disposition aux attaques de fièvre typhoïde, de toute autre maladie contagieuse, aux atteintes de scrofules, du phthisie pulmonaire, &c. Les statistiques sur lesquelles on s'est appuyé pour prouver cette étrange assertion sont à mes yeux complétement erronées.	Je n'ai jamais vu que le virus vaccin, emprunté à une pustule indubitablement vaccinale ait transmis soit la syphilis, soit les scrofules, soit toute autre maladie. Le virus vaccin ne transmet que la vaccine, mais pour plus de sécurité il me parait prudent de ne le prendre que sur des sujets bien sains.	Je pense que tous les médécins véritablement amis de l'humanité doivent employer tous leurs efforts pour rendre la pratique de la vaccination universelle. Je crois qu'il est convénable d'opérer la vaccination dans les premiers mois de l'existence.
413. Sandford, Rd., (Wolverhampton), Surgeon to South Staffordshire Hospital, and late Surgeon to the British Hospital at Jerusalem.	I have no doubt as to vaccination, when successful, affording perfect security from smallpox, in almost every case; and that those who suffer from it after vaccination, have it lightly; and that death is a very rare result.	I believe that vaccination only affects the system specifically, as regards smallpox, and that no increased susceptibility of any infective disease or of phthisis, is thereby afforded, nor is the constitution at all injured by the performance.	I do not believe that lymph from a true Jennerian vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional affection; or that a duly educated medical practitioner, with proper care, could unintentionally inoculate with some other disease.	All things being favorable I recommend that vaccination should be performed within three months of the birth of the child.
414. Sandwith, Humphry, M.D., (Hull), Physician to the General Infirmary.	I feel no doubt with regard to the former part of the question; and with regard to the latter, my experience will scarcely warrant me in giving a decisive answer.	I have no reason either to believe or suspect this.	I cannot speak from experience.	I strongly recommend it.
415. Sankey, W. H. O., M.D., (Hanwell), Medical Superintendent Female Department, Lunatic Asylum; formerly Resident Medical Officer of the London Fever Hospital.	I have no doubt.	I have no reason to believe that vaccination renders the subject more susceptible of other disease, or renders such disease more fatal.	None whatever.	I do.*
416. Sargent, H. E., M.D., (Launceston), Union Medical Officer.	No.	No.	I believe that if the lymph be taken from a perfectly healthy subject, no fear need be entertained. But I believe also, that if, on the contrary, it be taken from a child afflicted with syphilis, scrofula, or other constitutional or specific disease, it may produce a vesicular eruption, partaking more or less of the character of such diseases.	Certainly.

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* I never made the subject mentioned in your marginal note [occurrence of continued fever in vaccinated persons] an object of particular inquiry or special observation; and perhaps, that I did not do so, is something of a proof that the idea of any connexion between vaccination and the mortality of fever was in my mind totally beyond the limits of probability. I have very considerable doubts whether good statistical data exist anywhere to throw any light on the hypothesis. W. H. O. S.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person. (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
417. **Savery, John**, M.D., (Hastings), Surgeon of East Sussex and Hastings Infirmary.	None.	I do not believe they are more liable to any other disease from having been vaccinated.	None.	Yes.
418. **Sayle, G.**, (Lynn), Senior Surgeon to the West Norfolk and Lynn Hospital.	I am of opinion that successful vaccination confers on persons a very large exemption from smallpox, and I have never seen one die from an attack of smallpox after vaccination, although several who refused to undergo its operation have died when attacked with smallpox.	None whatever.	No.	Most decidedly.
419. **Scott, Edwd. J.**, M. D., (Portsmouth), Senior Medical Officer of the Royal Portsmouth, Portsea, and Gosport Hospital.	I have not.	I have not.	I have not.	I do.
420. **Scott, Wm.**, M.D., (Huddersfield), Physician to the Infirmary.	No.	No.	No.	Yes. I am of opinion that vaccination is one of the greatest and most inestimable blessings ever conferred upon the human race.
421. **Seaton, Edward Cater**, M.D., (London), Surgeon to Chelsea and Brompton Dispensary.	(*Vide* Supplement, Page 139.)	—	—	—
422. **Sédillot, C.**, M.D., Professor of the Faculty of Strasburg.	A la première question je réponds que je ne conserve aucun doute sur l'immunité que vous signalez.	Sans accepter les objections élevées de nos jours contre la vaccine, je crois que les moindres doutes sur une question d'une aussi grande importance doivent être pris en sérieuse consideration, et qu'il y aurait lieu d'établir une serie d'experiences comparatives et de recherches propres à dissiper toutes les hésitations et toutes les craintes.	Je ne pense pas que la lymphe empruntée à une pustule véritablement vaccinale ait jamais transmis à l'individu vacciné, soit la syphilis, les scrofules, ou quelqu'autre maladie; et je ne crois pas qu'un pareil accident soit arrivé à aucun praticien exerçant légalement son ministère.	Je voudrais dans l'état actuel des choses que l'on rendît la vaccination obligatoire et universelle, à l'exception des cas où les parents voudraient recourir à l'inoculation et la feraient pratiquer.
423. **Seller, W.**, M.D., (Edinburgh), Physician Royal Public Dispensary.	None whatever.	None whatever.	I have obtained no evidence of any such effects.	As a general rule, I recommend the vaccination of every child.
424. **Semple, R. H.**, M.D., (London), Physician to Northern Dispensary.	None whatever.	None whatever.	I believe any such suppositions or statements to be entirely fabulous.	Yes.*

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* I was associated for many years with my father, who practised vaccination upon a very large scale for a period of about forty years, and among many thousand cases I never knew or heard of one in which the operation had been accompanied or followed by any injurious result. Among the cases vaccinated by my father and myself, I never knew or heard of a fatal case of smallpox; and I have not the least hesitation in expressing my opinion that, if the operation were invariably, properly, and carefully performed, the cases of smallpox after vaccination would hardly ever occur. The assertion that vaccination produces other diseases, I believe to be a pure fiction; and I am the more confident in taking this view, because I know one or two cases in which such an assertion was made, and in which, upon investigation, the charges brought against vaccination turned out to be wholly without foundation. R.H.S.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
425. Shann, George, M.D., (York,) Physician to the Dispensary and County Hospital.	Dr. Shann has no doubt or hesitation in giving an affirmative answer to this question.	Dr. S. has never met with any circumstances which induced him to suppose that vaccination increases the susceptibility to other diseases, or that it has any direct disadvantageous influence on the health.	(*a*) Dr. S. has met with so many instances in which skin diseases and general dyscrasia have been attributed to vaccination, that, after making every allowance for the propensity of mothers to allege this cause, he is inclined to believe that in certain cases there is ground for the allegation. He is led to suppose that the vaccination operates not so much by introducing a new infection from without, as by calling into action constitutional predisposition. He would exemplify this by the case of an infant born of a syphilitic parent, but not exhibiting the usual eruption till the period of vaccination, some months after birth. (*b*) Dr. S. knew two young ladies, sisters, who both commenced with an attack of hooping-cough, on being vaccinated from a child suffering from the complaint: this was a second attack in each case. The child was residing in the same village, and consequently there were other sources of infection in operation at the time.	Dr. S. would unquestionably advocate the universal practice of vaccination in early life, subject to the exceptions named in question the fourth.
426. Shapter, T., M.D., (Exeter), Physician to the Devon and Exeter Hospital.	I have no doubt.	No.	(*a*) It is difficult to answer this question satisfactorily. I cannot say I have witnessed the occurrence of these events, nevertheless I have seen instances (rare ones) in which eruptions have followed vaccination, and that hence has appeared to arise a future tendency to constitutional eruptive disorder. This has been chiefly of an eczematous, certainly not of a syphilitic character. Probably these cases have been constitutionally disposed to eruptive disorder, and that the inducing the vaccine vesicle had developed it. (*b*) No.	Yes.
427. Sharpin, H. W., (Bedford), Surgeon to General Infirmary.	I have no doubt.	No.	No.	Yes.
428. Shaw, Alex., F. R. C. S., (London), Surgeon to Middlesex Hospital.	No.	No.	No.	Yes.
429. Shaw, Geo., (Durham), Surgeon to the Infirmary and the County Prisons.	I have not the least doubt, from nearly 40 years' observation.	Vaccinated persons are less susceptible of phthisis than people who have had the smallpox. I am of opinion that smallpox frequently causes consumption.	In the hands of a duly educated medical man, there is no danger of any constitutional disease being introduced.	I recommend all children to be vaccinated before dentition, by a duly educated medical practitioner.
430. Sheppard, W. Y., (Bristol), Vaccinator to District No. 2, Bristol.	Not any.	Not any.	None whatever.	Decidedly, yes.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
431. **Sieveking, E. H.**, M.D., (London), Assistant Physician to Saint Mary's Hospital.	I have no doubt that successful vaccination does confer comparative immunity from smallpox.	There is no statistical evidence to that effect; the rates of the mortality from phthisis has not materially altered, since arrest of smallpox by vaccination.	I have frequently met with instances, in which the parents of sick children attributed their illness to the poison introduced by vaccination; to determine the reality of such occurrence would require a very careful investigation. The subject deserves attention, though I, individually, have regarded the instances adverted to as coincidences. There exists positive proof that vaccine lymph taken from the pustule of a syphilitic child does not communicate syphilis.	I should recommend that vaccination be universally performed before the termination of the sixth month. It frequently fails during the first three months, but rarely after the sixth.
432. **Sigmund, C.**, M.D., (Vienna), Professor in the University, and Surgeon to the General Hospital.	Yes. But to render vaccination that great blessing which, according to the observations I have made in three parts of the globe, it is sure to be when well managed, it is required,— *a.* That there shall be one or several public Institutions for vaccination, carefully superintended, from which any one may obtain gratuitous supplies of lymph; *b.* That in these Institutions re-vaccinations and retro-inoculations upon animals (cow, horse, etc.,) shall be effected from time to time; *c.* That in such Institutions an opportunity shall be afforded to all medical practitioners to become practically acquainted with the development of the vaccine vesicle, with the way to vaccinate, and so forth; and that the diploma for medical practice be not given to any one till he gives evidence of having really used these opportunities of instruction, and that young physicians shall not receive the diploma of a doctor before having proved that they have availed themselves of that opportunity. *d.* That all views and facts objected to vaccination be rigorously inquired into, and that there be published annually, in some journal of large circulation, a true account of such inquiries, and an elucidation of whatever has seemed doubtful or contradictory; together with instances in which vaccination, or more particularly re-vaccination, has given protection, against the contagion of smallpox when this disease has been in a neighbourhood.	No.	(*a*) The true Jennerian vesicle is so strikingly and so essentially different from the true vesicle of primary syphilis, that no educated surgeon could confound the two. The germ of a genuine syphilitic affection can therefore never be communicated by a duly qualified vaccinator. I am not in a position to say with equal positiveness, whether scrofulous and other constitutional ailments can be thus propagated. I suspect that observations do not exist sufficiently extensive, copious, and minute, or sufficiently founded on comparison of cases, for answering this question. And the use of the word "scrofulous" is too much at the option of the observer. (*b*) No educated practitioner could commit the mistake referred to in the second part of the question.	Decidedly yes.
433. **Simson, James**, M.D., (Edinburgh), Surgeon to the Edinburgh Prison Boards.	None.	I have no reason to believe that they are more susceptible to other diseases.	None.	I do.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been the vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
434. Skey, Fred. C., F.R.S., (London), Surgeon to St. Bartholomew's Hospital, &c.	None whatever.	Certainly not. In my opinion this idea is preposterous.	(*a*) I have not. (*b*) I am acquainted with no example of the kind.	Assuredly I do.
435. Smith, E., M.D., (London), Physician to Hospital for Consumption, Brompton.	I think it must have this effect. But as we can only infer this from the lesser mortality of the present day, how are we to dissociate the influence of the virus from the improved treatment of such maladies, and from the weakened power of the smallpox virus, the effect of time, or other causes? The latter is an inference which may be supported by analogy.	I know of no evidence, but in relation to phthisis it is a fair subject for scientific inquiry.*	(*a*) It is difficult to answer this, for a vaccinator does not always or perhaps commonly use lymph taken by himself from a vesicle. (*b*) I certainly have several times seen cutaneous and vesicular eruptions follow the use of the lymph supplied by the Government. And so far only, the latter may be inferred to be causative of the former.	Yes. But as to the very important question of the necessity for re-vaccination, what evidence can we obtain as to the length of time the protective influence may last? Have we a right to assume that it shall be for the whole of life, as we believe is the result of most of the exanthemata? My impression would be that it is not a long protection, and that we want evidence carefully collected on this point, and the frequency of the necessity for re-vaccination.
436. Smith, W. Tyler, M.D., (London), Physician Accoucheur to St. Mary's Hospital.	I have no doubt whatever on these points.	I have no reason to believe so.	The communication of secondary syphilis is the only case about which I have any doubt; and I would certainly avoid vaccinating from an infant with a secondary syphilitic eruption.	I do.
437. Smith, Sam., F.R.C.S., (Leeds), Senior Surgeon to the General Infirmary.	I have entertained that opinion upwards of 30 years.	To the first part of this question I say 'No;' to the second part, I have sometimes seen cutaneous eruptions of no great moment, which I have attributed to vaccination.	I do not either suspect or believe it.	I prefer to wait three months after birth; but, if smallpox should prevail in the neighbourhood, I do it much earlier.
438. Smith, W., (Manchester), Surgeon to the Royal Infirmary.	I have not the least doubt on the subject.	No; certainly not.	I have never met with a case in which such a result has occurred.	Yes; decidedly so.
439. Smith, W., M.D., (Weymouth), Physician to the Sanatorium for Diseases peculiar to Women and Children.	Not the slightest.	None whatever.	This question has agitated the profession for years. For my own part, I believe that syphilis can only be communicated from a primary chancre; and therefore lymph from a true Jennerian vesicle has never been a vehicle of syphilis. I would hesitate however to say the same regarding scrofula; and that children have not been constitutionally injured, by being vaccinated from others so affected, when in the hands of careless practitioners.	I would recommend vaccination in all cases at an early period of life. But as many children die before they are one year old (and a very few of them from smallpox), it might be a question of economy to put off the limits for vaccination to at least twelve months.

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* The evidence from which to deduce anything beyond 'opinions' appears to me to be of difficult attainment, and considering that difficulty, I should attach but little value to the mere opinions of men who have not proved themselves more than ordinarily fitted for the investigation of truth and for original inquiry. This difficulty, with the great importance of the subject, the fallacies which modern investigation has of late years found in dogmas formerly promulgated with equal authority to this, and the improved modes of inquiry of the present day, would lead me to desire the appointment of a Medical Committee of half-a-dozen of the most able and zealous investigators of the present day, who should thoroughly investigate every alleged doubt, and publish the evidence upon which their conclusions would be founded.

I could not induce a self-willed patient to submit the younger members of his family for vaccination, on the plea that it was unnecessary, and that his elder children had been inoculated for the smallpox successfully. At length two of them had the smallpox, but most lightly, and then he submitted the youngest for vaccination, which was performed with matter from the Government, and was followed by an eruption which disfigured the child, and annoyed the parents for months. Thus in both directions vaccination was disgraced, or inferred to be unnecessary. E. S.

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440. **Smyth, S. T., M.D.,** (Yarmouth), Surgeon to the Hospital and Dispensary, and to Gaol and Police Force.	No.	No.	No.	Yes.
441. **Snaith, Thos.,** (Horncastle), Surgeon to the Dispensary, and Union Medical Officer.	After upwards of 40 years' experience, I am certain that successful vaccination exempts the very great majority of persons from attacks of smallpox. During this long period, in a tolerably extensive practice, I have not met with more than ten or a dozen cases of smallpox after vaccination, and those of a light character.	As far as my experience goes, the vaccine disease does not render persons more susceptible of other diseases; and I have not observed that their health is in any other way disadvantageously affected.	No, I do not.	Yes; I think from six to twelve months the best age for the performance of the operation; although infants under three months generally do well.
442. **Snow, John, M.D.,** (London), late President of the Medical Society of London.	Not any doubt.	Not any reason.	Not any reason.	I recommend that, except for special reasons, vaccination should be performed during the first three months of life.
443. **Solly, S., F.R.S.,** (London), Surgeon to St. Thomas's Hospital.	No.	No.	No.	Yes.
444. **Soltau, W. F., M.B.,** (Plymouth), Physician to the Public Dispensary.	I have none whatever, from the experience of the disease which I have had in Paris, and this country, for the last sixteen years.	No; nor can I imagine upon what possible data such a conclusion could be founded.	No.	Yes.
445. **Southam, G., F.R.C.S.,** (Manchester), Surgeon to the Royal Infirmary.	No.	No.	I am of opinion that great care should be taken in the selection of lymph from healthy children; and that it should not be taken after the eighth day, or when it has become purulent. I cannot say that lymph has been the vehicle of other infection than cowpox, but I have frequently seen strumous, and occasionally syphilitic eruptions, develop themselves after vaccination; the vaccination having brought the disease into activity, which was previously latent. I consider that where there is the slightest hereditary tendency to either of these diseases, vaccination should be delayed until the period of infancy has passed.	Assuming due provisions to exist for its successful performance, I do. But not such provisions as at present exist. Unless the public vaccinators are required to personally perform the operation, and mark its effects, having previously inquired into the child's health, the operation will often be attended with unfavourable results. By the present plan the operation is too frequently left in the hands of unqualified assistants, or apprentices, who want the experience necessary to discriminate between the cases where it should be undertaken, and those where it should be delayed: also the cases from which the lymph should be selected.
446. **Spence, Jas., F.R.C.S.,** (Edinburgh), Surgeon to Royal Infirmary and Dispensary.	No.	No.	The first part of this question is difficult to answer decidedly, as to the impossibilty of such diseases being communicated by vaccination, in case of the lymph being obtained from a syphilitic patient, or performed with a lancet which had been used for opening a bubo, for example; but, if ordinary care be used, it may be safely said such an accident *ought never* to occur in the hands of a duly educated medical practitioner.	I can hardly conceive any case where it should not be performed at an early period.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
447. **Spry, J.**, (Truro), Surgeon to the Cornwall Infirmary.	I have no doubt whatever of the efficacy of vaccination, on both points.	I have no reason to believe or to suspect either alternative.	I have never seen or heard of any such case. I have vaccinated, and examined after vaccination, many thousands of cases.	I do most earnestly recommend and uniformly inculcate the practice of early vaccination.
448. **Square, W. J.**, (Plymouth), Surgeon to Devon and East Cornwall Hospital.	I have no doubt whatever that successful vaccination does produce these results.	No.	(*a*) I have never seen such result, in a practice which has been very extensive for twenty years. (*b*) I have never known such a case.	Yes; and should prefer the commencement of the fourth month.
449. **Squibb, G. J.**, F.R.C.S., (London).	None.	None.	Certainly not.	I prefer an early period.
450. **Startin, Jas.**, F. R. C. S., (London), Senior Surgeon to the Hospital for Diseases of the Skin, Bridge Street, Blackfriars.	I have no doubt that vaccination is the prophylactic indicated in this inquiry.	I have not; with the exceptions contained in my reply to the next questions.	This is a difficult question to answer satisfactorily, as the reply must rest upon what is to be regarded as a "true Jennerian vesicle," as this vesicle in a subject suffering under constitutional or acquired syphilis, or from porrigo, or even scabies, might be still a "true Jennerian vesicle," though not a pure one; and these maladies I have many times seen transferred from such a vesicle. I have also seen the same maladies inoculated by public vaccinators from unintentional vaccination, and such parties I presume are "duly educated medical practitioners."	In every case, I would recommend that vaccination should never be practised from a vesicle evidencing any signs of internal or external disease; nor should any subject be submitted to vaccination having similar manifestations.
451. **Steele, E. Y.**, (Abergavenny), Surgeon to the Dispensary.	I have vaccinated many hundred persons during a period of 26 years; and not one of these persons has, so far as I can ascertain, ever had smallpox. I have never attended a fatal case of smallpox, presenting satisfactory proof of previous vaccination. I am quite convinced of the almost perfect protective influence of successful vaccination.	I do not believe or suspect any such influences to be derivable from vaccination.	I have every reason to be convinced of the contrary.	I unhesitatingly recommend that vaccination be performed within three months from birth, if the infant be healthy, and the weather not oppressively hot; or, at the earliest period after that time that circumstances may permit.
452. **Stephens, Thos.**, Public Vaccinator, North Shields.	I have no doubt.	I have not.	I have met with no cases to sanction such a belief.	I do.
453. **Stewart, D.**, M.D., (Warley), Staff Surgeon, First Class, East India Company's Depôt.	Such is my most fixed belief, in every case where the operation has been faithfully performed, and has proved successful.	No; but I believe that the vaccine, and all other exanthems, are followed very frequently by a marked proclivity to some other form of eruption, which does not go off for some months. Thus, I have cases now under treatment, of (modified) smallpox succeeding to scarlatina and measles.	Such cases were often reported to me in India; but I was never able to verify any one. My firm belief is that true Jennerian lymph properly used never produces any evil results.	I have always recommended this; and also that it should be always performed under strict professional superintendence.

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454. **Stokes, W.,** (Dublin), Regius Professor of Physic in the University of Dublin.	I have no doubt that successful vaccination confers an exemption from variola, in the great majority of instances. I doubt, however, if it gives an absolute security against death by variola.	I have not the slightest grounds for such an opinion.	I have known of a few cases in which *re-vaccination* was performed, in which the constitution suffered. In some cases symptoms of a cachectic state were induced; in others, the glands in the neck and axilla became irritated and engorged, as in the scrofulous condition. I have heard of a fatal case of diffuse inflammation, induced by re-vaccination. I never knew or heard of syphilis being thus communicated; nor can I say that the lymph used in the above cases was genuine; but they occurred in the hands of well educated practitioners.	I do, without any doubt.*
455. **Stolz, A.,** M.D., (Strasbourg), Professor to the Faculty, &c.	Je n'ai pas le moindre doute sur la vérité de cette assertion. L'observation attentive de tous les faits qui se sont produits dans notre pays m'en a donné la conviction le plus profonde.	Je n'ai aucune raison de croire que des sujets vaccinés, et préservés par la vaccination, de la petite-vérole, soient plus exposés à contracter quelque maladie contagieuse que ce soit. Je ne crois pas non plus à certaines assertions populaires d'après lesquelles les scrofules et la phthisie pulmonaire seraient plus communes depuis que l'on vaccine; si en effet la statistique demontrait qu'il en est ainsi, il faudrait en chercher des causes ailleurs, et elles ne seraient pas difficile à trouver.	Je ne pense pas qu'il soit possible d'inoculer avec le virus vaccinal un autre virus, telle que celui de la syphilis, des scrofules, ou d'une autre maladie. J'ai souvent entendu des parents accuser le virus vaccin de certaines maladies développées peu de temps après l'inoculation; mais si l'on avait osé remonter aux véritables sources on les aurait trouvées. La vaccination peut être, suivant moi, tout au plus la cause accidentelle du développement de certaines maladies, maladies dont le germe existait à l'état latent dans l'économie; mais les premières semaines après l'opération écoulées, je ne pense pas que la vaccine puisse encore être accusée d'avoir réveillé un germe quelconque.	Je crois qu'il serait avantageux de rendre la vaccination obligatoire. Dans notre Département (du Bas-Rhin) où elle a été pratiqué avec soin par des médécins de district dits médecins cantonaux, la petite-vérole était à peu près inconnue pendant vingt-cinq ans. Alors elle y a été importée par des voyageurs, et depuis elle reparait presque tous les ans, dans les grands centres surtout, même sur des individus vaccinés. Je ne vaccine les enfans qu'à l'âge de quatre à six mois, dans le but d'obtenir une réaction générale très prononcée; généralement on les vaccine trop tôt—à l'âge d'un mois ou de cinq semaines; je crois que la disposition réactionnaire n'est pas encore assez développée à cet âge, et que la préservation de la petite-vérole est alors moins sûre.
456. **Stone, Thos.,** (London), F.R.C.S., Resident Medical Officer to Christ's Hospital. (*See* Supplement, p. 152).	—	—	—	—
457. **Storer, Chas.,** M.D., (Nottingham), Physician to the General Hospital.	I have no doubt on this head.	On this head; I have no reason to believe vaccination injurious.	I have no reason to think, that where the matter is taken from a healthy subject disease can be communicated. But where the children of the poor are vaccinated in large numbers, sufficient care is not always taken to procure the matter from a perfectly healthy subject; whence noxious matter is inoculated and often produces great mischief.	I do.

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* I have learned from some of my brethren in the country parts of Ireland, that inoculation with variolous matter is still occasionally practised, though not by members of the profession. I have also heard that, in a case of this kind, the magistrate declined to interfere unless the medical man of the district became himself the informer. This is surely wrong. The practice of inoculation is more likely to be persisted in, in the families of the rich than of the poor; and it ought not to be expected that the local medical man should incur the hostility of influential persons by coming forward as the informer. W.S.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
458. Stromeyer, M.D., (Hanover), Professor of Surgery and General Staff Surgeon to the Hanoverian Army.	Vaccination protects in most cases against smallpox, and at all events almost perfectly against its fatal issue. Here, in Germany, where (with exception of some ambitious authors, who are fond of new-fangled things, but receive little public consideration) everybody is pleased with seeing vaccination legally introduced, it had likewise to struggle against many difficulties. In my youth, that is to say, from 30 to 40 years ago, I have heard a great deal of it; because my late father was the first who introduced vaccination on the Continent, and he was concerned in all those proceedings which led to the general recognition of Jenner's invaluable discovery.	I have never found a case of typhus, scrofula, or phthisis, in which there was any reason to think the origin of the disease connected with vaccination; nor, speaking generally, have I ever seen an evil effect of vaccination.	I hold either to be impossible. An uneducated or careless practitioner can, however, as in single cases experience has proved, propagate the syphilitical poison with the lymph of spurious Jennerian vesicles. I am happy to add, that no such case has ever happened in the kingdom of Hanover. By acknowledging no certificates but those of educated and duly examined practitioners, the State will in my opinion do what is possible to prevent abuses in a system of compulsory vaccination.	Vaccination performed by educated and conscientious practitioners deserves not only to be recommended, but to be promoted by the State in every practicable manner, as one of the greatest benefits to the human race.
459. Sutton, J., (Blackheath), late Senior Surgeon to the Kent Dispensary.	No. I have been in medical practice between fifty and sixty years, and I have not witnessed a single death from smallpox subsequent to vaccination. And I think, where vaccination has been properly done, the patients are nearly as exempt from smallpox as those who have been inoculated for that disease, as I have seen secondary cases of smallpox.	No.	No.	I have, in almost all cases, vaccinated my patients at about three months old.
460. Swayne, J. G., M.D., (Clifton), Physician Accoucheur to the Bristol General Hospital.	None whatever.	No.	No.	Yes.
461. Symonds, J. A., F.R.S., (Bristol), Consulting Physician to the General Hospital.	Not the faintest degree of doubt.	Certainly not.	Never.	So much so, that I consider that a government which does not make vaccination compulsory throughout the people over which it presides, is culpably negligent of the interests of that people in particular, as well as indifferent to the welfare of the human race. I have no doubt that, if all governments would insist on the performance of vaccination, smallpox would only be found in the pages of history.
462. Tapp, W. D., F.R.C.S., (Dorchester), Senior Surgeon to the Dorset County Hospital.	I have no doubt.	I have no reason to believe or suspect such to be the case, or that their health is in any other way disadvantageously affected.	No, I have not; and I do not believe, or suspect, that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner.	I do.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
463. Tatham, T. R.,(Huddersfield), Surgeon to the Infirmary, Medical Officer to the Workhouse and Hospital, &c.	I am of that opinion.	I have been in practice 30 years, and have had no reason to suspect that vaccination has any such tendency.	I have reason to believe that lymph, taken from a true Jennerian vesicle and a healthy person, does not produce any such effect. I have observed, however, six children vaccinated from the same lymph, taken from a healthy individual, and that five ran their natural course, while the sixth was spurious, producing an herpetic eruption, and I had reason to suspect the child was suffering from some malady or constitutional affection.	Yes, I do so recommend.
464. Tatum, G. R., (Salisbury), Surgeon to the General Infirmary.	No.	No.	No.	Yes.
465. Tatum, Thos., F.R.C.S., (London), Surgeon to St. George's Hospital.	I have no doubt.	None whatever.	Certainly not.	I do.
466. Taylor, W., (North Shields).	I have no doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, nor have I ever seen a case of the disease ending in death after successful vaccination.	I have no reason to believe that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other disease, or that their health is in any other way disadvantageously affected.	I have no reason to believe that lymph from a true Jennerian vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection, to the vaccinated person; nor have I ever seen a case of unintentional inoculation with some other disease, instead of the proposed vaccination.	I decidedly consider the early period of life, except for special reasons in individual cases, the proper time at which vaccination should be performed. (The foregoing opinions are founded on an experience of 34 years; 4 years' practice in an extensive colliery district, 6 years as Resident Apothecary to the North Shields and Tynemouth Dispensary, and 24 years private practice in the same town.
467. Teale, T. P., F.R.C.S., (Leeds), Surgeon to the General Infirmary.	No.	No.	No.	Yes.
468. Terry, H., F.R.C.S. (Northampton), Surgeon to the General Infirmary and County Gaol.	I have no doubt whatever on either of these points.	I have not.	I have no facts on which I can substantiate such opinion; but, at the same time, I think it right to use only such lymph as is taken from a healthy child.	It has been my custom, during a long course of years, to recommend the age of three months as the earliest period for vaccination.
469. Thomas, H., F.R.C.S., (Sheffield), Honorary Surgeon to the General Infirmary.	None whatever.	I have not.	Having carefully investigated many of these cases I answer, No.	I consider it the bounden duty of every well wisher of his species.
470. Thompson, Theophilus, M.D., F.R.S., (London), Physician to the Hospital for Consumption.	In the course of many years dispensary practice and otherwise, a proportion, though very inconsiderable, of cases of smallpox in the vaccinated has been under my care; but I do not recollect that a single instance of death amongst such individuals has come under my observation.	Certainly not.	Quite the contrary.	Undoubtedly.

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471. Thomson, F., M.D., (Perth), Visiting Surgeon to the City and County Infirmary.	I have no doubt on the matter.	None whatever.	(*a*) I am not sure that syphilitic poison may not be communicated even by a true Jennerian vesicle, as the latter may exist in an infant infected with the poison of syphilis; but I have never vaccinated with such lymph. (*b*) I am not aware of any instance in accordance with the last part of the question.	Most certainly.
472. Thomson, D. P., M.D., (Liverpool), Medical Officer to the Parish of Liverpool.	None whatsoever. (Cases of vaccination within the last four years: 3,400.)	None whatever.	In my own observation I have not found any infectious or specific (syphilitic) disease communicated, care having been taken in the selection of a good vesicle for the lymph.	Yes; and that all practitioners should be rewarded for their trouble in so vaccinating.
473. Thurnall, W., (Bedford), Surgeon to the Infirmary.	I am thoroughly convinced that vaccination renders persons much less liable to attacks of smallpox; and when they do take it, the disease assumes a much milder form.	Not the slightest.	No; sometimes, after vaccination, the patient will have troublesome sores break out, which I believe are owing to the bad state of the patient's blood at the time of vaccination; and not the fault of the lymph. I have seen different children vaccinated from the same lymph, when one child, (very fat and gross,) had many troublesome sores on the back and lower extremities, while the other had merely the ordinary pustule from the vaccination.	Most certainly; but I think it would be better to extend the time to six, instead of three months; and if all adults, (as far as practicable,) who have never been vaccinated were compelled to be vaccinated, I believe, in a few years, we should rarely meet with a case of smallpox.
474. Thursfield, Thos., *since deceased*, (Kidderminster), Surgeon to the Infirmary.	None whatever.	No.	None whatever. I have known a child vaccinated, No. 1.—another, No. 2.—and another No. 3. No. 1. goes through the usual phases; No. 3. the same; and No. 2. shall have an impetiginous eruption, lasting for years, and very troublesome, succeeding to, and apparently consequent on, the vaccination, which has been healthy, and ran the usual course. From this I infer that no particular complaint is communicable at the time of vaccination, but that a state of disturbance is induced in the system, in some constitutions, independent of the character of the vaccine lymph used.	I think, for obvious reasons, it is right to vaccinate some time in the first six months; and that it is well to re-vaccinate about the twelfth or fourteenth year. I also think that at least one vesicle should remain untouched, as I am quite sure the protection against smallpox is very greatly dependent upon the integrity of, at least, one pock. We know that in smallpox, opening the pock in the first stage, on the face of the patient, goes a long way to prevent the full stage of suppuration, and the consequent marking; and I am of opinion that opening the vaccine vesicle of the seventh or eighth day arrests its course, and sadly interferes with its protective character. I make a scratch on the skin, thus (——); and a similar one I make below it. Very little bleeding results; and I am enabled to rub the virus well into the scratch. This plan seldom fails. I get usually a confluent eruption, of at least two heads, all along each scratch; and one of these I never puncture. So particular am I on this point that, in case of only one taking, I seek a supply of matter in some other case rather than interfere.

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475. **Todd, R. B.**, M.D., F.R.S., (London), Physician, King's College Hospital.	I have no doubt that successful vaccination confers a very large exemption from smallpox, not only on the individual vaccinated, but in a less degree on his descendants; and the more so, if both parents have been vaccinated; and I also think that it powerfully opposes death from smallpox.	Certainly not.	Not the least.	Most certainly. I would have a good supply of well-paid public vaccinators, selected by competitive examination; and I would not confide this important duty to overworked and underpaid parish doctors. No public money could be better spent than in carrying out, on a large scale, a well organized system of public vaccination.
476. **Tomkins, J. N.**, F.R.C.S., (London), Inspector of Vaccinations to the National Vaccine Establishment.	No doubt whatever.	No reason to believe such to be the case.	After an experience of 21 years as a vaccinating surgeon, and having vaccinated upwards of 40,000 children, I have never known syphilitic, scrofulous, or other constitutional infection to be communicated by the operation. One solitary case came to my knowledge in my official capacity; and which I reported to the Board of the National Vaccine Establishment, where vaccination performed with a foul lancet (such lancet having been used to open buboes) caused severe topical and constitutional symptoms.*	I would not fix the period too early, and think four months preferable to the three named by the provisions of the Act now in force.
477. **Toulmin, Fras.**, F.R.C.S., (Clapton), Consulting Surgeon to the Infant Orphan Asylum, Wanstead. (*See* Supplement; p.)	I have no doubt of the preservative effects of vaccination. In a wide field of observation, for 35 years, I have only personally known one death from smallpox after vaccination.	I have no reason to believe that vaccination is ever attended, or followed, by the results alluded to.	I have never seen any disease follow, as a consequence of vaccination, with the exception of two cases of erysipelas from the puncture; a *very* rare occurrence.	Most decidedly.
477a. **Travers, B.**, F.R.S., (London), past President of the Royal College of Surgeons; Surgeon Extraordinary to the Queen; Surgeon in Ordinary to H.R.H. Prince Albert.	None.	I have never seen reason to entertain such an opinion.	(*a*) My experience has not furnished me with reason to believe that the true Jennerian vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection. (*b*) To the last part of the question I can only reply, that I have never met with such an instance.	Most certainly.
478. **Trotter, Chas.**, (Stockton-on-Tees).	I have no doubt but successful vaccination exempts from attacks of smallpox to a *very large* amount; and almost entirely prevents death from that complaint. I am not aware of ever having attended a fatal case of smallpox, where there was no doubt of previous successful vaccination. After having the principal general practice of an extensive district for 30 years, I cannot have the least doubt of the beneficial influence of vaccination. In all cases of smallpox that I have seen follow vaccination, up to adult age, they have been most mild, and never produced disfigurement after that period. I have seen some severe cases, so as to lead to the belief that the protective influence of vaccination had been worn out of the system. Still natural smallpox does the same; as I have had cases, after having had the natural disease previously, and being much marked.	Quite the contrary. A severe case of natural smallpox very much predisposes to other serious diseases.	I have not observed any of the unfavourable results referred to above, and do not believe in their occurrence. Children of tainted constitution may have eruptions following vaccination; but such would be produced by any irritation set up in the system.	I do; and, if such were invariably performed, I believe smallpox would become extinct. I consider a great omission in the present Act was, making it compulsory the August after its coming into operation. Surely, all *known* to be unvaccinated, (of which there are numbers,) and all not having had smallpox, ought to be obliged to be vaccinated.

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* There was nothing syphilitic about the mal-vaccinated children, only phlegmonous erysipelas extending over the arms and shoulders. J.N.T.

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479. TROUGHT, S., (Louth), Surgeon to the Dispensary.	I have no doubt whatever.	I have no reason to believe so. I have never had a case brought to my notice where the health was so disadvantageously affected.	(*a*) I have no reason to believe so; and during thirty-five years practice no such case has presented itself. (*b*) I have no reason to suspect such could be the case from careful vaccinacination.	I do most strongly and forcibly recommend that vaccination should be universally performed in early life.
480. TROTTER, J., M.D., (Durham), Physician to the County Hospital.	I have not.	I have no reason to believe that vaccinated persons become more susceptible of any infectious disease, or of phthisis, by being rendered less susceptible of smallpox.	I have no reason to believe, or suspect that lymph from a true Jennerian vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person. My father had nine children. I was the oldest, and had smallpox from inoculation; all the rest were vaccinated, and never had smallpox or any eruptive disease, or anything that could be attributed to vaccination. I myself have had 11 children. All were vaccinated, and none have had smallpox, or any complaint which could be attributed to vaccination.	I recommend that, except for special reasons, vaccination should be invariably performed at early periods of life. It should be skilfully performed; and regard as far as possible ought to be had to get the lymph from healthy subjects. The person operating should ascertain the result of the vaccination; and, if necessary, repeat it.
481. TURNBULL, JAMES, M.D., (Liverpool), Physician to the Royal Infirmary.	I have no doubt at all that it is so.	It has appeared to me that very few persons pitted from smallpox are affected with phthisis. Beyond this I have no reason whatever for suspecting that such might be the case.	No.	Yes.
482. TURNBULL, W., M.D., (Huddersfield), Senior Physician to the Infirmary.	I have no doubt whatever.	I have no reason to believe that vaccination renders persons more susceptible of any other disease, or that their health is in any way injured thereby.	I have never known of any such occurrence, nor do I believe that it has ever happened.	I strongly recommend this. I would allow no child to enter a school, or to be an apprentice, or taken into service or active life in any way, without being able to show a certificate of vaccination. The Emigration Commissioners justly enforce this.
483. TURNER, G., M.D., (Stockport), Senior Physician to the Infirmary.	No doubt at all.	No such instance has come to my knowledge for 35 years in this town; and I regard it as an unsubstantiated and groundless opinion.	I cannot help thinking that if the operation of vaccination had been exclusively confined to the profession; and not, unfortunately as it has been, interfered with by any old woman or ignorant gossip, this prejudice respecting vaccination would never have spread or gained credence.	I do.
484. TURNER, T., F.R.C.S., (Manchester), Surgeon to the Royal Infirmary.	I answer this question without hesitation in the affirmative.	No.	No.	I am of opinion that vaccination should, in every instance if possible, be performed before the child has attained his sixth month; but there is no objection to its being done at any subsequent period.
485. TYACKE, N., M.D., (Chichester), Physician to the Infirmary and Dispensary.	I consider that vaccination proves about as effectual, in preventing and in modifying smallpox, as an attack of smallpox, the recurrence of that disease.	No.	No.	Yes.

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486. Ure, Alex., F.R.C.S., (London), Surgeon to St. Mary's Hospital, &c.	I have none.	I have none.	I have none.	I do.
487. Uthwatt, E. A., (Stroud), Surgeon to Dispensary and General Hospital.	No.	No.	No.	Yes.
488. Velpeau, —, M.D., (Paris), Professor of Clinical Surgery to the Faculty, Member of the Institute, Officer of the Legion of Honour.	Non.	En aucune façon.	Je suis convaincu que non.	Oui.
489. Vose, J. R. W., M.D., (Liverpool), Physician to the Royal Infirmary.	I have not.	No.	No.	I do.
490. Wade, J. G., (Wath-upon-Dearne), Medical Officer Wath District of Rotherham Union.	I have no doubt whatever.	Certainly not.	I do not see how anything of the sort can occur.	I do most certainly recommend vaccination to be performed at the early periods of life.
491. Wakefield, H., (London), Surgeon to the House of Correction, Coldbath Fields.	None whatever.	No.	No.	Not earlier than three months.
492. Walker, James, (Sheffield), Honorary Consulting Surgeon Accoucheur to the Public Dispensary.	No doubt.	No.	No.	I do.
493. Walker, W., F.R.C.S., (Edinburgh), Senior Surgeon to Eye Dispensary.	I have no doubt.	I do not think that they are.	No, never.	I do.
494. Wallace, Jas., M.D., (Greenock), Surgeon to the Infirmary and Poor House.	I have no doubt whatever.	No.	No.	Yes.
495. Waller, Chas., M.D., (London), Physician to St. Thomas's Hospital.	None whatever. The only case of death from smallpox after vaccination I have ever seen occurred in a young man about twenty, who had ruined his constitution by the free use of ardent spirits.	None.	None.	Certainly.
496. Wallis, G., M.D., (Bristol), Consulting Physician to the Royal Infirmary.	I have no doubt but that vaccination defends a large body of persons from the attacks of smallpox, but it is not an absolute security against smallpox. I have seen smallpox occur twice, and in one case death took place, the individual's face having been severely pitted by the first attack. Vaccination is a milder disease, and therefore may not protect the person so completely.	I do not believe that any other disease is likely to be induced by vaccination. But ignorant persons think "post hoc propter hoc."	No.	I do.
497. Walshe, W. H., M.D., (London), Physician, University College Hospital.	No.	I have no such reason, founded on my own experience.	(*a*) I do not believe lymph of the kind has ever transmitted any disease except the specific, one which generated itself. (*b*) I can offer no positive opinion on this clause of the question.	Yes

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
498. **Ward**, N. B., F.R.S., (Clapham), Vaccinator in the National Vaccine Establishment.	Having been one of the Government Inspectors for forty years, during which period I have vaccinated forty thousand persons, I am enabled to answer this question with some degree of confidence. About fifty cases of secondary smallpox have been reported to me, out of the number vaccinated, and I do not know of a single fatal case having occurred.	I have not.	Most certainly not.	I should recommend early vaccination in every case, provided there did not exist any unhealthy condition of the child.
499. **Ward**, W., M.D., (Huntingdon), Senior Medical Officer to the County Hospital.	I have no doubt that successful vaccination confers all the advantages stated in the question.	I have never seen anything to justify such an opinion, nor do I believe that vaccination can produce any unfavourable effect upon the health or constitution.	My experience of more than thirty years is entirely opposed to both suppositions.	I am against vaccinating at a very early period of life. My observation and experience lead me to believe that one frequent cause of failure, or of smallpox, occurring after vaccination, has arisen from its having been performed at too early an age. I should much prefer five or six months to three.
500. **Washbourn**, B., M.D., (Gloucester), Physician to the Infirmary.	Not the slightest.	None whatever. The usually slight constitutional distemper, attendant on the absorption of the virus, occasionally becomes of a severe character; but as it is generally owing to a vitiated condition of the blood, induced by want of proper ventilation, cleanliness, &c., or by internal derangements, as nervous irritation occasioned by teething, &c., it is the fault of the practitioner if he perform the operation under such circumstances.	None whatever.	Undoubtedly.
501. **Watkin**, T. L., M.D., (Durham), Physician to the County Infirmary.	Not the least doubt.	No.	No.	At an early period of life.
502. **Watson**, **Eben.**, M.D., (Glasgow), Surgeon to the Royal Infirmary.	I have no doubt that successful vaccination does confer such exemption.	I have no reason for any such belief, and I do not entertain it.	Among the out-door patients at the Glasgow Royal Infirmary I have seen several cases of abscesses in the arm, and also of superficial ulcerations of the skin, apparently following and caused by vaccination, though performed by duly qualified practitioners: these were poor children. Again, in my own practice among the better classes, I have occasionally met with more or less persistent irritation of the skin round the position of the pock. In all these cases, I am convinced that the lymph employed, though apparently pure, was not really so. It may have been mixed with pus, and I think then, in some cases, it acts as a local irritant. But I have no reason to think that in these cases, or in any others, the constitution was affected deleteriously by the vaccination.	Certainly.

———	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
503. **Watson, Thos.**, M.D., (London), Consulting Physician to King's College Hospital.	I am certain that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox. Although it does not confer absolute security against death by smallpox, it reduces the risk of that event to a very small amount; and affords much greater security against it, than could in any other known way be obtained.	I have never had any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis, or that their health is in any other way disadvantageously affected.	I have never had any reason to believe, or suspect, that lymph from a true Jennerian vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection, to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner.	Assuming due provisions to exist for a skilful performance of the operation, I do earnestly recommend that, except for special reasons in individual cases, vaccination should never be delayed beyond the third, or at most the fourth month after birth.
504. **Watts, T. H.**, M.D., (Manchester), Physician to the Royal Infirmary.	No.	No; but many delicate persons are preserved by vaccination, whom, without it, smallpox would have destroyed early in life; and many of such delicate persons thus saved by vaccination, ultimately die of constitutional disease, such as tubercle.	No.	Yes. And I also advise persons to undergo vaccination when smallpox becomes epidemic in their neighbourhood, or in a family circle.
505. **Wattsford, W. J.**, (Greenwich).	None whatever.	I have never been led to suppose that any kind of disease was the effect of vaccination.	I have not.	In the earliest periods of infancy there seems to be often an exemption from infection, a young infant frequently escaping when a whole family has been involved in it. For this reason I have been in the habit of vaccinating as late as possible; never under three months from birth, if I could help it.
506. **Webster, J.**, M.D., F.R.S., (London), Consulting Physician to St. George's and St. James's Dispensary.	None whatever. On the contrary I consider cowpox, if properly done, almost an absolute security, excepting in very rare examples and peculiar constitutions.	According to my observation and experience, I have not seen such consequences ensue.	I do not believe so. And in reference to the second question, I have never heard of an instance.	In all persons unless they are in bad bodily health or labour under eruptive skin diseases, vaccination ought to be performed; the best period of life being from the fourth to the sixth month of the infant's age. And the operation should always comprise three punctures on each arm.
507. **Weir, W.**, M.D., (Glasgow), Physician to the Royal Infirmary and Fever Hospital.	I have no doubt whatever. In 40 years' practice I have never seen death occur from smallpox after proper vaccination.	No; rather the contrary.	Such has never occurred within my experience.	I do recommend very early vaccination.
508.* **Welch, F.**, (Taunton), F.R.C.S., Surgeon to the Taunton and Somerset Hospital. [* *On receipt of these answers (Nov. 21, 1856,) I immediately wrote to Mr. W., begging to be favoured with some particulars on the subject adverted to under No. 3. Hitherto no answer has been received.—J. S. May 6, 1857.*]	I have very great doubts whether vaccination at all exempts a person from an attack of smallpox; and certainly not from death.	From the number of persons I have attended in smallpox after vaccination, I do not consider they are rendered less liable to that disease: whether more or less susceptible of other diseases, I have not observed.	I believe lymph from a true vesicle has been the means of frequently conveying syphilitic, and other eruptive diseases from one person to another.	I do not recommend vaccination at all. I would gladly inoculate my own children with the smallpox.

——	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
509. WEST, CHARLES, M.D., (London), Physician Accoucheur to St. Bartholomew's Hospital, and Physician to Hospital for Sick Children.	No.	Decidedly not. In a very few very weakly children, I have seen vaccination followed by a degree of febrile disturbance which left them ailing for some few weeks. The same thing, however, occurs with far greater frequency after chickenpox. It is of extreme rarity after vaccination; and I mention it because the last clause of the question seems to require it. The occasional occurrence of erysipelas and even of gangrene of the skin around the punctures ought to be mentioned. I can give no statistics about it; but I have never but once seen death from this cause, and the accident is of very great rarity. [*See* Supplement, p. 146].	None whatever.	Most decidedly.
510. WESTALL, E., F.R.C.S., (Croydon), Surgeon to the East India Company's Military Seminary, Addiscombe.	I have no doubt; and my conviction is borne out by my experience. I have seen more fatal cases of smallpox after smallpox (natural, so to speak) than after vaccination.	I have not the slightest reason to believe in, or to suspect, any such increased susceptibility.	I have no reason to believe it myself; but I have heard of the itch being communicated to a considerable number of persons; and in one case well authenticated.	I believe that one operation is sufficient for life, and affords as perfect an immunity as possible. I never saw a severe case of smallpox where there had been a good vaccine scar. I never recommend revaccination if there be a scar.
511. WHARTON, (Bedford), Physician to the General Infirmary and Fever Hospital.	None whatever.	None.	None.	Strongly.
512. WHIPPLE, I., (Plymouth), Surgeon to the South Devon and East Cornwall Hospital.	I have no doubt that vaccination exempts from smallpox in a large, very large, degree; and that when smallpox attacks after vaccination, the disease is in almost all cases benign.	I have not any reason for thinking such is the case; nor can I conceive such would be the result of vaccination.	(*a*) I am not capable of answering the first part of your question. I should have my fear of syphilis. (*b*) I fear many are not careful in selecting their cases for vaccinating others.	I do.
513. WHITE, D. W., (Newcastle-upon-Tyne), Physician to the Infirmary and to Gateshead Dispensary.	None; that it gives great security against attack, as also favourably influences the mind; I mean in such as are aware of the malignance of the disease.	No; not more susceptible to other diseases.	The popular opinion here (*not* the medical one) is, that the constitution may be so affected. I have seen no decisive proof, but think it worthy of investigation. The tendency of parents with delicate children to ascribe evils to other than themselves, renders their testimony at least doubtful.	Universally, and repeated at particular intervals.

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514.***Whitehead, Jas.**, M.D.,(Manchester), Senior Officer in Ordinary to St. Mary's Hospital. [**On receipt of these answers (Nov. 5, 1856,) I immediately wrote to Dr. W., inviting further information on the statement made under No. 3. Hitherto none has been received. J. S.—May 6, 1857.*]	My experience leads me to the belief that vaccination confers on persons subjected to its influence complete immunity, for a number of years, from attacks of smallpox, and has the effect of rendering any future attack less injurious, or less severe, and is a security against death by such attack.	I have no reason whatever to believe that vaccination increases the susceptibility to diseases of any kind.	(*a*) I have seen several instances of the transference of the syphilitic taint through the medium of vaccination, the lymph having been taken from a true Jennerian vesicle, or presumed to be so, at least, in a tainted infant; and I have known eczematous eruptions, apparently of a simple nature, in this way reproduced: but not scrofula. (*b*) With respect to the latter part of this question, I can only answer as regards syphilis. I believe that the inoculation of matter taken from a syphilitic sore, in any of its stages, is capable of producing its characteristic phenomena in the inoculated.	I strongly recommend the performance of vaccination in all cases, except when contra-indicated by existing disease, in early infancy. The age of three to six months I believe to be the most suitable; but earlier than three months, should smallpox be prevalent in the vicinity.
515. **Whiteside, J. H.**, M.D., (Stockton-on-Tees), Surgeon to the Dispensary.	No.	No.	No.	Yes.
516.**Whiteside, W.**, M.D., (Ayr), Surgeon to the Ayr Prison.	I have no doubt that successful vaccination confers a very large exemption from smallpox, and an almost absolute security against death from that disease.	I do not believe that the diminution of susceptibility to smallpox increases that to other diseases; or disadvantageously affects the health in any way.	I can suppose that lymph taken from a subject labouring under such diseases might be a means of communicating these; but cannot think that such would occur in the hands of a properly qualified practitioner.	I always recommend and perform vaccination, unless prevented by some special reasons, at three months.
517.**Wilde, W.R.**, F.R.C.S., (Dublin), Surgeon to Saint Mark's Hospital; Assistant Commissioner for the Irish Census.	I have not the slightest.	I have no reason for believing that such persons are at all more liable to other diseases; I think they are not. But we have no statistical information on the subject, and to afford reliable statistics would require great time and labour.	Such is the popular belief; but I know no facts in support thereof. I suppose all inoculation with other diseases is unintentional.	I do. The question of secondary vaccination, at more advanced periods of life is, I think, worthy of attention; since it at least tests the perfection of that originally performed, which may not have been successful. In *three* Government Reports I recommended to the Lord Lieutenant of Ireland to direct the Poor Law Commissioners to order all persons entering our workhouses, who do not show sufficient signs of either vaccination or of smallpox to be immediately vaccinated. In 1851, the workhouses were the chief centres of smallpox. (*See* Report on Status of Disease: Irish Census.) I am of opinion that the lymph used is often spurious. As we still have the disease among cows in country parts of Ireland, I have recommended that an occasional fresh supply should be obtained. (*See* my Report to the Epidemiological Society.)
518. **Wilkinson, M.A.E.**, M.D., (Manchester), Physician to the Royal Infirmary.	I have none.	No.	(*a*) To the first question my answer is, No. (*b*) To the second, not in the hands of a judicious practitioner.	Yes.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
519. **Williams, Caleb**, M.D., (York), Lecturer on Materia Medica in the York School of Medicine.	None.	I have never thought that vaccinated persons were more susceptible of other diseases, or that they were in any way disadvantageously affected by vaccination.	The only inconvenience which I have seen to result from vaccination, has been a temporary cutaneous irritation in children predisposed to affections of the skin.	I would recommend that vaccination should be universally performed at early periods of life, unless there were some special reasons to the contrary.
520. **Williams, C. J. B.**, M.D., (London), late ~~First~~ Physician to University College Hospital, and Consulting Physician to the Brompton Hospital for Consumption and Diseases of the Chest.	I have no doubt whatever that vaccination very greatly diminishes the number of cases of smallpox, and very generally mitigates the severity of those cases which do occur after it. In illustration of the first of these statements, I may remark that, in my own practice, which is chiefly among the upper and middling classes, out of between two and three thousand patients that I see annually, the average number of cases of smallpox does not exceed three or four; and in reference to the second position, I may mention that for many years I have not met with a fatal case.	To this question I would reply generally in the negative. I know of no facts tending to prove that the mild febrile affection caused by vaccination renders the body prone to phthisis, or other form of scrofula. But I have met with several instances, in which phthisis, and other cacoplastic diseases, appeared to have been induced by natural smallpox, or by the disease, little modified by equivocal vaccination. Vaccination administers a *mild dose* of the variolous poison in a limitable and manageable form, and having only a moderate influence on the functions and composition of the body. Natural smallpox generally conveys a *strong dose* of the poison, the immediate effects of which may be destructive to the life of the blood, and other vital functions, and the subsequent effects of which (pyæmia, cachæmia, &c.) may be long and deeply felt in the nutrition and structure of the textures.	I do not recollect an instance in my own experience, in which such untoward results have followed vaccination, but I have heard of such, and I cannot but think that they were *not* the necessary consequences of vaccination, but of its indiscriminate and careless performance, as in taking the virus from diseased subjects.	Most decidedly, I do.
521. **Williams, R. L.**, M.D., (Denbigh), Consulting Surgeon to Infirmary and Dispensary.	None whatever.	I think there is no foundation in such an opinion.	I have no reason to believe any such suspicion.	Under six months, if practicable.
522. **Williams, E.**, M.D., (Colchester), Senior Physician to the Essex and Colchester Hospital.	No.	No.	No.	Yes.
523. **Wilson, Erasmus**, F.R.S., (London), Consulting Surgeon to the St. Pancras Infirmary.	None.	Certainly not.	No. I meet frequently with parents who believe an eruption, under which their child suffers, to have originated in vaccination; but the origin is in reality traceable to a different source.	By all means. I regard vaccination as one of the greatest medical blessings bestowed upon mankind.
524. **Wilson, George**, M.B., (Leeds), Senior Physician to the General Infirmary.	None whatever.	I have no reason to believe so.	(*a*) I have heard parents attribute such constitutional symptoms in their children to vaccination; but I have doubted it myself. Nevertheless, in the vaccination of my own children, I am very careful about the person from whom the lymph is taken; and I would have public vaccinators equally careful. (*b*) I have never known any other disease occur instead of the proposed vaccination.	I do.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
525. **Wilson, J. A.**, M.D., (London), Senior Physician of St. George's Hospital.	I have no doubt of the very large exemption. There have, I believe, been some very rare fatal cases of smallpox after successful vaccination.	No.	I know of no such case. The question first proposed is one of much interest. Many experiments on the result of inoculation, by a mixture of vaccine matter with the gonorrheal chancre secretions, are detailed in the '*Bericht*' for 1854–55, of the great Vienna General Hospital.	
526. **Wilson, J. B.**, F.R.C.S., (Whitehaven), Surgeon Whitehaven and West Cumberland Infirmary.	I have no doubt on this question, that successful vaccination is an almost absolute security against death from smallpox.	I do not believe that vaccinated persons are more susceptible of any other disease.	I suspect that lymph has been a vehicle of infection to the vaccinated person through the carelessness of the medical practitioner.	I should recommend vaccination to be performed at an early period of life; and, to be more certain of its protective effects, repeated at puberty.
527. **Wilson, Jos.**, M.D., (Whitehaven), Consulting Surgeon to the Infirmary.	I have no doubt.	No.	No.	Yes.
528. **Wilson, J. G.**, M.D., (Glasgow).	I have not the slightest doubt but that it does.	Not the least reason to think so.	No.	I generally recommend and perform vaccination about the third month.
529. **Wilton, J. W.**, F.R.C.S., (Gloucester), Senior Surgeon to the Infirmary.	I have no doubt that such is the fact.	I have not.	I have not.	I do.
530. **Wood, Alf. J.**, F.R.C.S., (Gloucester), Surgeon to the Infirmary and Magdalen Asylum.	The experience of twenty-five years has led me to form an opinion, that vaccination confers a large exemption, but that in order to such exemption being continued through life, it is requisite that the vaccination be from time to time repeated.	No.	(*a*) To the first part of the query, No. (*b*) To the second, no instance of such an accident has come within my knowledge.	I do; but I think the limit of three months, fixed by the Act, is injudicious. As a rule I do not vaccinate under four months.
531. **Wood, S.**, (Shrewsbury), late House Surgeon Salop Infirmary.	None whatever. I have always remarked that in cases of smallpox after vaccination, the cicatrix of the vaccine pustule has not been well marked. Indeed, I have observed that the vaccination cicatrices of those vaccinated thirty or forty years ago, are much larger and deeper than those of ten or fifteen years since. This point is worth remark.	Certainly not.	I have never seen a case where I could trace any of the diseases mentioned to vaccination from the true pustule.	Yes, both as a protection to the individual, and for the safety of the public.
532. **Woodforde, F. H.**, M.D., (Taunton), Physician to Taunton and Somerset Hospital.	I have no doubt that persons properly vaccinated, are in a very large proportion secure from smallpox, and almost absolutely safe from death by that disease, and that revaccination after a lengthened period, and when risk is incurred, renders persons quite safe.	I do not believe that individual susceptibility to any other disease is increased by vaccination, or that the health is in any other way disadvantageously affected thereby.	No.	I do.

—	*I. Have you any doubt that successful vaccination confers on persons subject to its influence, a very large exemption from attacks of smallpox, and almost absolute security against death by that disease?*	*II. Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of smallpox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?*	*III. Have you any reason to believe or suspect (a) that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; (b) or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?*	*IV. Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?*
533. **Woodhouse, J., M.D.,** (Hertford), Surgeon to the Infirmary.	None whatever.	No.	(*a*) I do not believe this myself. (*b*) No.	I do.
534. **Woodhouse, R. T., M.D.,** (Reading), Physician to the Royal Berkshire Hospital and to the Reading Dispensary.	I have not any doubt on these points.	I never knew any such results to follow the use of the vaccine virus.	I have not met with such results from vaccination, when properly and carefully performed.	I do.
535. **Worthington, W. C.,** (Lowestoft), Senior Surgeon to the Infirmary.	I do not entertain any doubt whatever.	My experience, which has been considerable, has not led me to any such conclusion.	I do not believe that such is ever the case; or if so, it is of rare occurrence.	I am decidedly of such an opinion.
536. **Wright, Thos.. M.D.,** (Cheltenham,) Surgeon to the Hospital.	I have none. (As a pupil attended 60 cases of smallpox: the only fatal ones were in persons who had not been vaccinated.)	I have no such suspicion or belief.	I have known certain cutaneous diseases to arise after vaccination, which has been regarded by the parents of the child as the cause of the same; but I have not been able to satisfy myself of the connexion.	I do.
537. **Wright, Thomas, M.D.,** (Nottingham), Surgeon to the General Hospital.	No.	No.	No.	Yes.
538. **Yonge, Jas., M.D.,** (Plymouth), Physician to the Hospital.	I have no doubt whatever on this point, and that careless or unprofessional vaccination is the chief cause of many apparent failures in security. I venture to state the following proof of effective protection. I was some years since called to see a child, in very hot weather, in a close room in a confined street in Plymouth, with some fever and incipient eruption. I was unable to decide on the definite character of the eruption, and called again the next day, when there was no doubt of its being a severe case of smallpox. I directed the vaccinator of the Dispensary to vaccinate three other children who were in the same room; but, on coming the next day, was disappointed at not finding it done. I then wrote a note, and it was done accordingly. The child I first saw died of as severe confluent smallpox as I ever saw. The other three children may fairly be supposed to have been infected. Both disorders proceeded in due course, but the worst of the three who had been vaccinated had not 30 pustules, and the mildest not ten.	None whatever.	None whatever.	Very decidedly; as, at the lowest rate of benefit assigned to vaccination, it must be a great boon to infant children. P.S. It is most likely that cases similar to the one I have stated have occurred to many others. But it must be considered to be a very strong evidence of the modifying and protective influence of vaccination, and the particulars may be relied on as accurate. Mr. Dunning, a zealous promoter of vaccination, and an early correspondent of Dr. Jenner, was very anxious I should publish it when it occurred. It certainly also answers very decidedly the fourth query.
539. **Young, J. Forbes, M.D.,** (London).	I have no doubt but vaccination confers a large amount of exemption from the attacks of smallpox, and absolute security against death by it. I have not, in 40 years' practice, met with a fatal case of smallpox after vaccination.	This is a point that has never been put to me, and has never occurred to me; but I do not think that less susceptibility of one disease increases the liability to others; and I cannot believe that health is materially affected by such an occurrence.	I have seen the true Jennerian vesicle, at least I believe so, to have been attended with very considerable disturbance, and in children of different families, but not of a syphilitic character. It might have been scrofulous, but that peculiarity might have been inherent previously in the children.	I do recommend its universal adoption; and that it should be enforced at early perods of life, and recommended to be repeated, at least once, after puberty.

SUPPLEMENT TO APPENDIX J.

Alphabetically arranged.

REMARKS on the alleged TRANSMISSIBILITY of SYPHILIS by Vaccination.—By WM. ACTON, Esq.

IN answer to your third question, "Has lymph from a true Jennerian vesicle ever been a vehicle of syphilitic infection to the vaccinated person?" I unhesitatingly affirm that I have never witnessed a single case which would bear out the supposition. I have, however, been consulted on several of these supposed cases, shewing that there are members of the profession who still entertain the opinion that such a mode of infection is possible; but in all these doubtful cases, I have been enabled to point out the sources of error, which I will shortly enumerate, as well as the reasons, founded on numerous experiments, which induce me to believe that a syphilitic taint cannot enter the system in this way. I have been more particular in investigating such cases from the conviction that syphilis is the only disease which can offer positive proof of the existence or non-existence of hereditary infection, inasmuch as it (syphilis) cannot be conveyed into the system either by the air we breathe, the food we swallow, or arise from the situation we live in; circumstances which may become sources of the other hereditary taints you allude to.

In the first place, I may be and have been told, that it was only after vaccination that the syphilitic taint appeared, the infant and the parents having been previously free from all traces of disease. In the opinion of some this is conclusive evidence of the mode of entry of the poison into the child's system. In several such instances that I have witnessed, my opponents have been unable to satisfy me that the child, from whom the virus was taken was a syphilitic infant; as I urge that we must not assume this important point, as is often done.

I have not alone, however, pointed out this source of error, but I have recalled to the recollection of those professional men who have consulted me a law which appeared to have escaped them, that syphilis in infants does not usually appear at birth; the child is born healthy, often is a very fine child, and it is from ten days to six weeks after birth that syphilitic symptoms appear; hence the reason why the apparent syphilitic infection follows vaccination. Under such circumstances, all that I can admit is, that vaccination does not prevent the development of syphilitic symptoms.

Another law is equally known to those who see syphilitic children, that if an infant is born with the syphilitic taint, the disease may not shew any external marks of its being in the system until some exposure or depressing cause comes into operation. Such may be vaccination: for no one will deny that the maturation of the vesicle is often attended with derangement of the child's health; and in such cases the evolution of the hereditary disease occurs as a natural consequence of a well-recognised law.

Another frequent source of error is diagnosis. I have given instances in the last edition of my work on Disease of the Urinary and Generative Organs, and have seen others since, in which children are said to have been the subjects of syphilitic taint who laboured under eczema, lepra, and papular eruptions, which the evolution of the vesicle had brought about. No specific treatment had been resorted to, and yet the child perfectly recovered. Seen by other persons, such instances might and have been called cases of children labouring under syphilitic taint introduced into the system by vaccination.

Although I have for a long time been fully convinced that infection cannot be thus introduced into the system, I have never felt myself justified in directly vaccinating healthy children from the virus of vesicles obtained from syphilitic infants; nor, to my knowledge, has any one else attempted it. The results, I feel convinced, would be negative, and the practice would be unattended with ill consequences. I venture to affirm this from the impossibility of inoculating secondary symptoms, which, in spite of all our numerous experiments, we have never succeeded in producing. Not only has the lancet been used, but portions of the secretion have been applied for lengthened periods to the skin of the person we wished to infect. In the last edition of my work, I have given an instance of a prolonged contact of two persons sleeping together; yet, even in this case, no contamination took place. A few exceptional cases have been cited by others of an opposite kind; but, on investigation, the sources of error have been shewn to arise from a want of the ordinary precautions which, when taken, proved to the operator the cause of his experiments differing from the general result.

If, however, we distinctly say, the lymph of the Jennerian vesicle is unable to contaminate the infant, there are plenty of other sources which we may choose from. Thus the fœtus may be infected by the father or by the mother; and, as shewn in my late work, infection may come, not from the legal or putative father, but from the true father (maybe a stranger) who is often not forthcoming when the case is investigated. Experience teaches the private practitioner that these sources of the taint are the most frequent; and it is to these we must look, and not to vaccination, as the cause of the complaint.

NOTES on the QUERIES as to VACCINATION sent from the Board of Health. By W. P. ALISON, M.D., F.R.S.E., Emeritus Professor of Medicine, Edinburgh.

THE question, whether successful vaccination gives security to a great majority of mankind against any attack of small-pox in future life, and to a much greater majority against fatal small-pox, has been generally regarded in this country for the last half-century as practically decided in the affirmative. And it is important again to consider the evidence on which this decision has been formed, were it for no other reason than this; that, if that evidence is truly insufficient, henceforth itmust be held to be impossible to establish any proposition as to the external causes of diseases by statistical inquiry and reasoning; and the science of etiology (*i. e.* of all such causes of disease, which is rested mainly on that ground, and which is thought to be the rational foundation for measures for the prevention of diseases) must be held to have no such foundation as can afford any security for practical usefulness.

The questions, whether any other diseases can be introduced into the human body by vaccination; whether the body, by successful vaccination, is rendered more liable to scrofula; whether any other epidemic diseases are rendered either more common or more dangerous by the influence of vaccination, or by the prevention of small-pox,—these are quite distinct from the question *as to the power of vaccination to prevent that disease*, which first demands consideration. They are all capable of decision in the present imperfect state of pathology (the science of the nature of diseases) only in the same way; by the force of numbers; and theywere all agitated and determined in that way, so far as the facts then known admitted of their decision, when vaccination was first introduced into this country. There can be no objection to their being agitated again after the facts which are believed to suffice for the decision of the first question have been fully considered: but the first object is, to consider whether or not we have at this time, in the matter of cow-pox, a power at our command, capable, if duly employed, of depriving the poison of small-pox of all fatal influence over an immense majority of mankind. And on this subject there has been quite sufficient information collected, since the date of the papers which were held decisive of the question fifty years ago, to show that the same inference it still inevitable, and that he who disputes it is equally unreasonable as he who opposes, in like manner, any proposition in Euclid.

Of course, when I say that there has been ample evidence to decide this question statistically, I mean to refer to cases where we have not only the negative evidence of large numbers of persons duly vaccinated not having subsequently been affected with small-pox, but the positive evidence of such duly vaccinated persons having been subsequently, most of them repeatedly, or for a long time together, exposed to the contagion of small-pox, *i. e.* placed in the same circumstances in which unvaccinated persons have been very generally affected, and many of them died of the small-pox; these vaccinated persons have nevertheless escaped, most of them without any indication of disease.

To show that this is the light in which I have always regarded such collections of facts, I quote one sentence from my own lectures, written as long ago as 1820–21, and repeated almost every winter since then:—" You " will remember that the question is, not how many vaccinated persons never take small-pox, but how many " vaccinated persons are fully exposed to the contagion of small-pox, and escape without any disease; and " our assertion is, that, so far as is yet known, absolute protection of the human constitution is the rule, and " the occurrence of any disease is the exception." And then I have proceeded further to show, that it is still doubtful how far the occurrence of that exceptional disease (particularly of the modified small-pox) after the cow-pox is more frequent, or whether it is more severe than formerly; but that, so far as yet known, the modified small-pox, which is the worst thing that need be apprehended in a duly vaccinated person, from the poison of small-pox, is nearly devoid of danger, simply because the modification consists essentially in shortening the course of the inflammation, and, by consequence, cutting off the secondary fever which has been long recognized as the dangerous part of the small-pox.

If, by evidence of this positive character, we establish this proposition, we may surely assert that the *onus probandi* rests heavily on those who, in the face of such evidence, would dissuade any portion of mankind from using a power, granted by our Creator, of so extensive application and so beneficent effect.

The arguments which I understand to be now employed in favour of a change in the present state of the law as to vaccination in England, and against the introduction of such a law into Scotland as would make vaccination compulsory, are exactly the same as were fully considered in a paper written by the late Lord Jeffrey, when editor of the Edinburgh Review, and published in that Review (vol. ix. p. 32) in 1807; to which it may be well to refer, as the opinion of a non-professional man, but a man known to be thoroughly practised in the examination of evidence in courts of law, precisely similar to that on which statistical arguments as to the external causes of diseases are founded.

Lord Jeffrey states, in regard to Dr. Jenner's first recommendation of vaccination as preferable to inoculation for small-pox as protecting against the disease, that it was " not until he vaccinated some hundred " children, and put them, at different intervals, to the test of inoculation for small-pox without effect, that " he ventured to publish his discovery in the year 1798 in a treatise, followed up the year after by a still " longer list of such experiments and observations." To the same purpose he observes, that, when the practice of vaccination was discussed and confidently recommended in 1800 by all the eminent practitioners in

London, this was done only after full consideration of its efficacy as compared with inoculation for small-pox, and that Dr. Woodville in particular, physician to the Small-pox Hospital, then stated, that within the last six months he had vaccinated there 7,500 persons, the half of whom had been since inoculated with small-pox matter without the slightest effect being produced in any one instance. (Ed. Rev. vol. ix. p. 38.)

There having been from this early date such positive proof of the power of regular vaccination over the poison of small-pox, it became generally agreed that the *onus probandi* fell upon those who opposed the practice. Many cases were soon stated in which it was alleged that the process had failed to give the desired protection, but, on examination of these cases, it may be stated with perfect confidence, that the general result was,—either that the vaccination had been demonstrably imperfect and had left no regular mark on the arm, or that, if small-pox did occur after vaccination, such small-pox was modified and nearly quite devoid of danger.

If these things are so, it follows neccessarily that the protection given by vaccination, although not absolute, is the best protection that we have against danger from the disease; besides being the only one which can be employed without danger to others; the inoculated small-pox being equally infectious, that is, implying an equal danger to others, as the natural small-pox, whereas the inoculated cow-pox has no infectious property.

From this it distinctly followed, that although these cases imposed upon medical men the task of inquiring further into the conditions and the marks of perfect vaccination, and likewise into those of modified small-pox as compared with those of inoculated small-pox (which, accordingly, was very carefully done) yet they afforded no argument whatever against the general use of the greatly stronger and perfectly safe security of vaccination in preference to the greatly weaker security of small-pox inoculation, especially as the latter was always attended with more or less of risk of extension of the malignant disease to others.

Of similar positive evidence as to the power of vaccination, duly conducted, over the extension and the danger of small-pox, the next decisive examples that were recorded, so as to be generally known in this country, were contained in Mr. Cross's "History of the Variolous Epidemic at Norwich, in the year 1819."

The town of Norwich appears, from Mr. Cross's statements, to have been nearly or entirely free from small-pox from 1805 till 1807; again, from 1809 till 1813; and again, from 1813 till the end of the summer of 1818, when it was introduced by a girl who had lately arrived from York with her parents, and having been exposed to the infection on the road, had fallen ill of the disease in Norwich. Several cases took their origin from this in the latter part of 1818, two of which were fatal. In January 1819, a druggist inoculated three children for small-pox, thereby helping to keep up the contagion. In February the disease got into one of the great charity schools, from which it extended to all quarters of the city, and "laid the foundation," says Mr. Cross, "for the most extensive destruction of human life that has ever, I believe, taken place in "Norwich in the same space of time, from any other cause than plague."

In this year 530 persons died of small-pox within the limits of the bills of mortality, which do not include several hamlets in the neighbourhood, where it also prevailed. Mr. Cross adds, that having found, by observation derived from various sources, that about one in six of all who were affected with the disease died of it, he is satisfied that "considerably above 3,000 individuals, or a thirteenth part of the whole population of Norwich, had the small-pox that year."

He kept a regular register of the effects produced by the contagion in 112 families, comprising 603 persons, into which it was introduced. In these families 297 had had small-pox before and escaped; 91 had been vaccinated and escaped except three, who had the mild disease or modified small-pox, to be mentioned afterwards; 200 who were unprotected took regular small-pox, with the mortality of 1 in 6; and 15, although unprotected, escaped, of which number 10 had been likewise exposed to the contagion before with impunity, implying a peculiarity of constitution long known to exist.

In all, he thinks, "not more than 1 in 20 vaccinated persons will be found to be in any way affected "by the most intimate exposure to small-pox; or less than 1 in 50 will have the disease in a form answering "even to the generally received description of modified small-pox."

Mr. Cross quotes an Account of an Epidemic Small-pox in the Kingdom of Würtemberg, in the years 1814–17, collected and arranged by Dr. Elsasser, after an examination of all the official returns of the medical men to the Government, by which it appears that precisely similar effects have been produced there as in this country by the contagion of small-pox. Precisely similar facts were also observed in an epidemic small-pox which occurred at Rotterdam in 1817 and 1818, and is described by Dr. Hodenpyl (pp. 178, 179).

Mr. Cross's work contains farther evidence of the practical efficacy of measures taken for enforcing vaccination on populations in different countries, at times when known to be threatened with epidemic small-pox; evidence which has not the same certain value as that which has been stated, because the proof of exposure to the contagion is there only presumptive; but, on the other hand, as the presumption extends to a much larger number of individuals (excluding, therefore, various chances of unperceived sources of fallacy) it was rightly judged from the first to be of the utmost importance as auxiliary to the former, and since that time has been almost indefinitely extended.

The following fact from the same work, taken in connexion with that stated above, as to the introduction of the disease into Norwich, affords a striking example:—"An individual falling down with the small-"pox in June, in the borough of Thetford, containing about 2,100 inhabitants, Mr. Bailey, surgeon, gave "information of it to the mayor, who immediately called a meeting of the inhabitants, and, from the able way "in which the measure was advocated, vaccination was immediately determined on. The parish officers visited

" every house, made a list of all those liable to the contagion, and threatened to expose any individual who " should refuse vaccination, or submit clandestinely to variolous inoculation. The list thus made was deli- " vered to the two surgeons, and the bellman was employed to announce the hour on the following morning " at which all those requiring it might be vaccinated at the churches of their respective parishes. These " prompt means were apparently successful. About 200 were vaccinated, most of them in the course of two " days, and small-pox extended only to eight or ten persons, all of whom survived."—(Cross on Variolous Epidemic, p. 267.)

From a statement furnished to Mr. Cross by Dr. Gordon, and which he had obtained from an extensive statistical work published in Denmark, it appears that in the city of Copenhagen *alone* 5,500 persons died of small-pox between 1788 and 1800, when vaccination was introduced; whereas the number that died of it in the *whole* Danish dominions from 1802 to 1818 was only 158. It is there the law that all persons shall be vaccinated, and the bishops and magistrates are required to take care that no one be received to confirmation, be permitted to marry, be admitted into any school or public institution, or be bound apprentice to any trade, without complying with this injunction. "An Annual Report is published of the results of vaccination, " which is judged to have been adequate by comparison with the numbers of births and burials" (p. 241).

A still more striking instance was then furnished by the principality of Anspach, in Bavaria, in which, as appears by a table given by Mr. Cross (at p. 248) more than one fortieth of the population, that is probably almost all the children that live to the age of six months, were vaccinated annually. In this district, in the year 1809, there were 4 deaths from small-pox; and since then, up to the end of 1818, not one had died of it. The deaths by small-pox in this district in the three years 1797–9, were above 500 annually, and in 1800 no less than 1,609; and what makes this instance particularly satisfactory, the small-pox prevailed epidemically, and to a great extent, during the four years 1814–17 in every part of the immediately adjoining state of Würtemberg (p. 245).

In Prussia, in which the deaths from small-pox before vaccination was introduced were 40,000 annually, they were under 3,000 in the year 1817, although the population had been considerably increased by accession of territory. And in the department of Breslau, containing above 500,000 inhabitants, and in which one twenty-eighth of the whole population were vaccinated in the year 1818, although small-pox was introduced in the course of that year in nine different places, yet in consequence, as we believe, of the extensive vaccination, and of insulating all who fell down of the disease, only 28 in all took it, and of these 6 died (pp. 244, 245).

It is painful, adds this author, to contrast these undeniable proofs of the power we possess of resisting the invasion of small-pox with the example now before us, where "530 lives were, in less than a year, " sacrificed to this disease in an enlightened city, where humanity abounds, and charity seeks for every " measure to prevent and relieve distress;"* a city previously, it will be observed, for five years at least, absolutely free from small-pox, viz. from 1813 to 1818 (see review in Edinburgh Med. Journal, vol. xvii. p. 116), while the city of Copenhagen had for ten years, at that time, been equally free of the disease.

Again, it is important to attend to the unequivocal evidence that has been put on record of late years as to the power of vaccination in preventing and, where it does not prevent, in modifying small-pox in the Indian possessions of this country; evidence, almost exactly similar to what has been observed in the different parts of Europe already mentioned, and therefore extending the argument to almost any climate on the face of the earth.

In consequence of the prevalence of small-pox in 1830 at many of the stations under the presidency of Bengal, a circular was issued by the Medical Board requesting the medical staff to furnish information on the subject, and more especially desiring a statement of any cases in which small-pox had ensued after vaccination; and the results, collected and reviewed by Messrs. Cameron and Mercer, are in the fifth and sixth volumes of the Calcutta Medical and Physical Transactions. The substance of their conclusions is contained in the following extracts from the Edinburgh Medical and Surgical Journal, vol. xliv. p. 489.

According to Mr. Cameron the replies showed that, though small-pox had prevailed extensively, and at some stations assumed the epidemic form, not one case was related of genuine small-pox succeeding to perfect vaccination. This statement has been rather unceremoniously controverted, and of course examined, by Mr. Mercer, who asserts that the deduction is erroneous, and that in the whole of the documents adduced by Mr. Cameron cases are recorded of a virulent and even fatal character of the varioloid disease in small-pox succeeding to vaccination.

On examination of these papers, however, it is gratifying to observe, that, while small-pox unopposed by vaccination continues to preserve its character of a severe, a mutilating, and a fatal disease, yet, as vaccination is becoming more familiar and general, and its real merits are more fully understood by the native population of Hindoostan, the influence of small-pox is progressively diminishing. In the course of eleven years, between the years 1818 and 1829, vaccination has been communicated to 335,575 persons in the presidency of Bengal, or about 33,000 of an annual average; and the reports of the surgeons amply and clearly testify that, though small-pox is still liable to recur from the causes already mentioned, yet the disease is stripped of much of its danger in proportion as the practice of vaccination is extended.

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* "History of the Variolous Epidemic which occurred in Norwich in the year 1819." By John Cross, M.R.C.S. Edinburgh Medical Journal, vol. xvii. pp. 130—2.

" The reports of Mr. Cameron and Mr. Mercer therefore concur in showing the justice of the conclusions
" which have several times been brought before the public in the pages of this journal. It has been here
" repeatedly shown that vaccination is not so perfect and absolute an antidote as Jenner and his immediate
" adherents imagined. But it has also been shown, that, while it does not positively exclude an attack of
" small-pox, nay, does not prevent in a very small proportion of cases (1 in 5,000) the chance of small-pox
" terminating fatally, it reduces that chance to an inconceivably small proportion, deprives the variolous
" poison of its most virulent and malignant effects, and must have been the means, under Providence, of preserving not only life, but features, sight, and health, to many thousands."—(Edin. Med. and Surg. Journal.)

" In many cases," says Mr. Cameron, " that had been previously vaccinated a varioloid disease showed
" itself, went through its course mildly, and disappeared in a few days. This showed, that, though vaccination
" is not so perfect an antidote as it was once thought to be against small-pox, it is at least the best that is to
" be had. That this is the state of the fact no one can reasonably deny who considers for a moment the
" degree of protection that was actually afforded in the cases mentioned in the replies to the Medical Board's
" Circular, even in the midst of a desolating visitation of the disease."

" I am particularly anxious," says Mr. Furnell, Assistant Civil Surgeon at Sylhet, " to have vaccination
" established, from having witnessed its utility in the late comparative exemption of this station from the
" dreadful ravages of the small-pox in this district."

Mr. A. M. Clarke also, after mentioning that at the city of Mooradabad small-pox had prevailed epidemically, and had destroyed in the course of six months 653 persons, chiefly young, and 598 in the suburbs, adds, that so far as he could ascertain no case of small-pox after vaccination occurred in Mooradabad, and that the extreme prevalence and fatality of the disease had served to remove the prejudices of the natives against vaccination; for they observed that vaccinated persons escaped small-pox, when others were ill on every side; and, in consequence, Mr. C. had daily numerous applications to vaccinate both old and young.—(" On Vaccination in Calcutta," by William Cameron, Esq. Med. and Phys. Transactions of Calcutta, vol. v. p. 385. Edinb. Med. Journal, vol. xliv. pp. 489–492.)

Similar observations, as to the frequent occurrence and the occasional epidemic extension of small-pox, have been recorded, both in the Mauritius and in Ceylon, and the power of vaccination has been equally manifest to the medical observer and to the natives themselves.

The extensive and careful observations on all epidemic diseases which Dr. Stark has had the means of making since he became Superintendent of Medical Statistics under the Registration Act in Scotland, have shown that both the preventive power and the mitigating power, above illustrated, of vaccination over small-pox, continue to show themselves just in like manner, and, as far as can be ascertained, in very exactly the same degree in Scotland, where the disease has repeatedly threatened to become epidemic of late years. The most striking example was at Dundee, and has been recorded in his Report (for Jan. 1856) of the mortality of the eight principal towns in Scotland. In that month, the whole deaths in these eight towns, from the zymotic class, amounted to 554, and constituted 27 per cent. of the total mortality. The prevalence of epidemic small-pox in Dundee caused this proportion to be greatly exceeded in that town; thus, while in Edinburgh the mortality from the zymotic class of diseases constituted only 21 per cent. of the total deaths, in Perth and Paisley 22 per cent., in Glasgow 23, in Leith 26, in Greenock 28, and in Aberdeen 30 per cent., the proportion in Dundee was so high as 45 per cent. of the total deaths.

Small-pox was still on the increase in Dundee during January, and manifesting itself as an epidemic in October,—it caused 19 deaths in that month; in November 25; in December 51; but during January not fewer than 95 persons fell victims to that loathsome disease. The deaths from the single disease constituted not less than 30 per cent. of the total mortality, a mortality which has been exceeded by no single disease in Dundee during the last 10 years, with the exception of the epidemic typhus, in the month of November 1847, when the deaths therefrom numbered 108, and the fatal cholera epidemic of 1849, when the deaths from that disease during the months of July, August, and September, numbered respectively 209, 420, and 159. Most of the victims of the small-pox had not been vaccinated; and the remarks of the registrar (not medical) of the second district of Dundee are well worthy of serious consideration:—" Since this disease broke out last
" year," says he, " I have been carefully observing the various cases (deaths) registered, and from these
" observations, and the information I have acquired by conversing with the parents and medical gentlemen of
" the district, I am under the conviction, that if the vaccination of their children was rendered imperative
" on all parents the severity of the disease would be greatly mitigated, and many precious lives would be
" saved. In confirmation I may state, that out of the last 30 cases (deaths) I have registered there has not
" been one child that was properly vaccinated, and that there are several families who have lost one or
" more of their children who had not been vaccinated, while their other children who were ill at the same
" time, but had been vaccinated, recovered. These are common cases, and, I think, plainly point out the
" necessity there is for legislative measures being taken to enforce the fulfilment of the duty of vaccination
" on all parents."

In the other towns the mortality from small-pox is either trifling or the disease is altogether absent. (" Monthly Return of Births, Deaths, and Marriages registered in the Eight Principal Towns of Scotland, with the Causes of Death at Four Periods of Life; January, 1856.")

Some months afterwards, and on a more general review of the mortality of 1856, Dr. Stark observes.—"Small-pox has appeared here and there, chiefly in over-crowded localities, and where the sanitary arrangements were defective. After the conclusive evidence which has been again and again furnished, relative to the protecting powers of vaccination against that loathsome disease, it is surprising that parents do not protect their children against its ravages by having them vaccinated."

Several of the registrars append to their returns notes bearing on this point. Thus, the registrar of St. Nicholas' district, Aberdeen, remarks, that "During the quarter there have been 24 deaths from small-pox, in all which cases, with one or two exceptions, the persons had not been vaccinated." The registrar of Old Kilpatrick, in Dumbartonshire, states, that "Five children, all under 8 years of age, have died from small-pox, and they were not vaccinated." The registrar of Kirkmichael, in the county of Ayr, remarks of the deaths of small-pox, that "none of the deceased were vaccinated," adding that, "when vaccination has been attended to the cases have been of a mild type."—(Quarterly Return of the Births, Deaths, and Marriages registered in the Divisions, Counties, and Districts of Scotland; Quarter ending September 30, 1856; p. 4.")

It thus appears, that while the effects of duly conducted vaccination upon small-pox appear to be almost exactly the same as fifty years ago, the extension of small-pox among unvaccinated children in Scotland is still such, and its increase in the form of epidemics from time to time so rapid, that the deaths from this disease (never less, of late years, than 2 per cent. of the whole annual mortality in the eight large towns of Scotland) should be as great as 30 per cent. in one of them during one month of 1856; and that this should be referable to the neglect of vaccination by the official authorities of this civilised and enlightened country, at a time when the savages of New Zealand practice vaccination willingly and generally, and in the opinion of the English medical officers in that part of the world, keep their country absolutely free from that disease.

As to the evidence lately brought forward in England it cannot be necessary to go into details. The virulence of the contagion still shows itself, but its extension is distinctly circumscribed in London, the fatal cases having gradually declined from 328 in the first quarter of 1855 to 74 in the last quarter of 1856. How much of the protection which must exist against the disease has been given by vaccination, and how much by previous small-pox, I know no means of judging accurately in civil life; but in the army it appears, from the statements of Dr. Balfour and Dr. Seaton, that about 78 per cent. are protected by vaccination and 22 per cent. by previous small-pox, and that the protection is such that the whole annual ratio of cases of small-pox occurring in the army, although exposure has been pretty frequent, has not been more than one in 2,000 men. And of the boys admitted into the Royal Military Asylum at Chelsea since 1803, it appears that only 37 have had small-pox subsequently to admission, and of the remaining 5,743, 1,950 appear to have been protected by previous small-pox, and 3,824 by vaccination.—(See Dr. Seaton's paper in "Journal of Public Health," January, 1857.)

Again, while the annual mortality in Great Britain and Ireland from small-pox alone at the end of the last century was not less than 35,000, the average annual mortality in England and Wales from small-pox for seven years, up to 1853, was reduced to 5,412, in a population which had increased to nearly 18,000,000; and of these 5,412 (three fourths of whom, at least, were under the age of five) it appears distinctly that an immense majority had never been vaccinated.

These facts having been clearly ascertained, it is not surprising that in foreign countries, particularly in Sweden, Bohemia, Venice, and Lombardy, the mortality from small-pox which was 65 in the 1,000 (as proportioned to the whole mortality) at the time when the only protection that was sought was by inoculation for small-pox itself, should now have fallen to 7 in the 1,000, or even 2 in the 1,000 (as shown by a Report of a Committee of the Epidemilogical Society, Parliamentary Paper of 1853) since vaccination has been compulsory in those countries; nor that Dr. Seaton should report, that while nearly 2,000 communications have passed through his hands in the last four years from practitioners in various parts of Britain and the British Colonies, where small-pox had appeared, many of them recommending improvement and extension of vaccination, not one has recommended that vaccination should be given up, and protection sought by inoculation for the small-pox.

Nor is it surprising that M. Bousquet, who has been since 1824 the best authority in France on the subject of vaccination and its effects, should strongly recommend re-vaccination rather than inoculation for small-pox, as a protection against a threatening epidemic, and should refer with confidence to various parts of Germany where this has been practised, as he believes, with the best effect (see "Bulletin de l'Academie de Medicine, en Archives Generales," Juillet, 1856, p. 111) in illustration of the difference of the two modes of protecting a population.

But it does appear surprising that, in the face of such facts, an attempt should be made to retard the progress which it was hoped the British Legislature was making to assimilate itself, as regards the protection of the population from small-pox, to what has been for many years past generally understood as the duty of the Government of a civilized and intelligent people in other parts of Europe.

I am aware that, both in France and in Germany of late years, some medical men have expressed doubts as to the power of vaccination, and especially have endeavoured to renew the original argument against the practice; an argument founded on the supposition that other epidemic, and especially other eruptive, diseases, may either be aggravated or "turned inwards," and be part of the cause of dangerous affections of the bowels, often attending, or attended by, typhoid fever. But this is exactly the same argument as was employed by Dr. Brown of Musselburgh and others, as well as by the authors mentioned in Lord Jeffrey's review, fifty years ago; and as the attention of practitioners at that time was very fully directed to the subject, particularly between the years 1815 and 1820, it was generally allowed in Scotland that no reasonable objection to vaccination existed, it may be safely assumed that no evidence appeared of its producing any such injurious effect on any other epidemic disease. Certainly there have been since 1815 various epidemics in Scotland, of measles, hooping-cough, at least two varieties of continued fever, of scarlet fever (the most malignant of any in its effects on children), as well as of cholera; and not only has no observation been made by any practitioners of high character of vaccinated children having suffered more than others from these diseases, but the cases we have seen, and the descriptions that we have of all the different epidemics, have shown that these different diseases have presented the same characteristic symptoms and the same remarkable varieties, as were known and described long before vaccination was heard of. At present we know that the town of Dundee, which suffered so severely by small-pox in the early part of last year, has had, besides, a virulent epidemic scarlatina, causing 90 deaths, or 22 per cent. of the whole mortality in that town in the two months of October and November. And similar observations may be made on hooping-cough and measles early in the season. So that there is no reason whatever to suppose that neglect of vaccination, and the prevalence of small-pox, have had any favourable effect on the constitutions of the children of that town as regards other epidemics.

In regard to scrofula, in all its forms, it has always been taught in the Scottish medical schools that it frequently occurred as a *sequela* of small-pox; and this disease has been regarded as therefore frequently a mutilating when it was not a fatal one; and whatever diminishes the frequency and fatality of small-pox must therefore be thought likely to diminish rather than increase the tendency to scrofula.

Lastly, in considering the question of vaccination as compared with inoculation for small-pox (taking the case of an adult individual proposing to protect himself against this disease) we must always remember that the former process involves no risk whatever to any one not acted on, whereas the latter cannot be performed without more or less of risk of infection to others. The introduction of the former into any population, therefore, even supposing it to be a sin as regards the patient himself, is no crime as regards his neighbours; whereas the latter must, in any case, be a crime of more or less, sometimes of extreme, malignity towards others.

The following quotation from Lord Jeffrey's paper, formerly quoted, illustrates this difference of the two processes very distinctly :—

"The advantages of vaccination, according to the report of its advocates, are,—(1) that the disease which
" it communicates is not in any degree infectious; (2) that it is as effectual a preventive of small-pox as the
" old inoculation; and (3) that it produces a disease infinitely milder and less hazardous than arose from the
" former practice.

"Of these three invaluable properties ascribed to cow-pox by its admirers, the *first* is unequivocally
" admitted by its opponents: the disease is universally allowed not to be infectious. If there be any
" ground for ascribing the other properties to it, this alone must be admitted to give it an immense advantage.
" If it be but *nearly* as safe a disease as inoculated small-pox, or *nearly* as effectual a preventive, it must be
" incalculably preferable to it, with a view to the interests of society. By inoculating small-pox the hazard
" of the community is inevitably increased; and as the disease is extremely infectious, it is evidently quite
" impossible to aim at its extirpation by the continuance of the practice. By vaccination no malady can be
" propagated beyond the person of the patient; and if he be effectually withdrawn from the risk of small-pox
" contagion, it is evident that a prospect is held out of finally extirpating that tremendous distemper
" altogether. In inoculation, we can only hunt the wild tigers with the tame ones, and therefore can never
" exterminate the breed. In vaccination, we run them down with other animals, and, with due exertions, may
" clear the country of them entirely." (Review of Papers on Vaccine Inoculation, by Robt. Willan, M.D., and others; Edinb. Rev. 1806; vol. ix. p. 50.)

REMARKS in reference to the Question whether "Vaccinated Persons, in being rendered less susceptible of Small-pox, become more susceptible of any other Infective Disease, or of Phthisis."—By Dr. BALY, of St. Bartholomew's Hospital, F. R. S.

No facts that I have met with have led me to believe or suspect that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of any other infective disease, or of phthisis. Other infectious diseases are observed to spread according to laws of their own, and almost without exception they attack persons of the lower classes of society, amongst whom vaccination is much neglected, with more frequency and more virulence than those of the higher classes who have, with few exceptions, been vaccinated.

Phthisis is, in a very large proportion of cases, inherited. It then often affects several children of a family; and it does this with more certainty among the lower than among the higher classes, although vaccination is much more generally practised among the latter. Phthisis also arises independently of hereditary predisposition, in single individuals of different families, owing usually to some special circumstances having weakened or disturbed the health. And this, too, occurs much more frequently in the lower than in the higher classes of society.

A French author has propounded the notion that typhoid fever, or intestinal typhus, is only the internal form of small-pox; and maintains that vaccination, while it prevents the development of small-pox on the outer surface of the body, merely turns it upon the internal surface of the bowels. He seems to base this theory chiefly on two grounds:—(1) the recent recognition of the typhoid fever; and (2) the fancied resemblance of form between the intestinal disease in this fever and the eruption on the skin in small-pox.

This theory must appear utterly absurd to any physician well acquainted with the two diseases; but, as it might, nevertheless, be received by the laity as a valid argument against vaccination, I venture to state some of the facts which show its futile character.

With regard to the recent recognition of typhoid fever as a distinct fever attended by peculiar diseased changes in the bowels, it may be sufficient to say that at the time when this discovery was made, namely, the beginning of the present century, the anatomy of diseases had been only partially and imperfectly cultivated, and the exact characters of many internal diseases now familiar to us were yet unknown; and that no good writer has doubted the previous existence of typhoid fever, although the descriptions of it left by the early physicians are vague and indistinct.

The supposed resemblance between the intestinal disease of the fever and the eruption of small-pox has no real existence. The former affects, almost exclusively, certain oval patches of glandular structure, situated at certain spots along the interior of one portion of the bowels. The small-pox eruption appears as small distinct pimples, which may form on any part of the surface of the skin. These pimples, when the disease reaches its height, contain " matter," and are called pustules; and such pustules are often seen even on the interior of the mouth, throat, and windpipe. The disease in the bowels in typhoid fever, on the other hand, never presents pustules containing matter. Moreover, the general symptoms, the course, and the duration of the one disease are unmistakeably different from those of the other disease.

Small-pox, again, is a highly contagious disease; and the only known source of the virus producing it is the bodies of persons already suffering from the disease. Typhoid fever is only in a slight degree infectious, and the miasma which gives rise to it is developed in the atmosphere.

Lastly, the essential difference between the two diseases, and their independence the one of the other, is clearly shown by the fact that in localities of limited extent one of them often prevails with severity without the other appearing; while even in London, though both are at all times present to a greater or less extent, they attain respectively their highest degrees of prevalence very generally at different times.

REMARKS on the alleged TRANSMISSION of DISEASES by Vaccination.—By ROBERT CEELY, Esq., of Aylesbury.

IN regard to the propagation of scrofula by vaccine inoculation, I think it not improbable that the "irritable" vesicles, which scrofulous skins sometimes yield, may occasionally be productive of *local* irritation in peculiar skins, to which the lymph of such vesicles has been injudiciously transferred. But I do not believe that any constitutional taint has ever been thus communicated.

In regard to the propagation of syphilis concurrently with vaccina, I have never witnessed such result, but must refer you to " Traité Theorique et Pratique des Maladies de la Peau," par F. Rayer, tome prem. p. 611, sec. 484, as to the possibility.

I do not believe that many educated practitioners have unintentionally propagated any other disease instead of vaccination, though I do know that such an act has often been imputed with more or less of plausibility. I have known *erythema* and *erysipelas* propagated from "irritable," or ruptured, or late, or exhausted vesicles, or from apparently healthy vesicles in a child who had a blister behind the ear, or from lymph decomposed by long keeping in a fluid state. I have also known *impetigo* and *ecthyma* result from genuine lymph from a healthy subject transferred to an *apparently* healthy skin, these troublesome diseases superseding the vaccine altogether. But all these are rare events, and most of them more or less avoidable. There can be no doubt, however, that the vaccine secondary fever and cutaneous local inflammation will excite in predisposed subjects eruptions of *strophulus*, *eczema*, *lichen*, &c., &c., *just as small-pox, measles, scarlatina, dentition, and other febrile diseases are known to do.* And I have contended, and do contend, that there is a secondary vaccine eruption often observed, especially in young and healthy children with tense, sanguine skins, in warm weather.

It is a true *vaccine* " secondary" eruption. It is often seen in the cow with vaccina. I have seen it also in the vaccinated dog. In all it occurs on or about the acme and decline of the vaccine disease. It appears in solitary or grouped papulæ which, in less than 24 hours, become vesicular, running the course of varicella. I have occasionally seen it so severe as to create serious indisposition from its extent on the cutaneous and mucous surfaces. These I have alluded to in my papers, in Transactions of the Provincial Med. and Surg. Assⁿ, Vol. 8, p. 135, and Vol. 10, p. 231. I have coloured drawings of this eruption in the cow, the dog, and in children, in all stages. But the lymph of this secondary vaccine vesicular eruption is not contagious, nor does the disease leave any permanent evil.

It may be confidently asserted, from reason and experience, that the alleged transmission of diseases by vaccine inoculation is equally applicable to small-pox inoculation; that all the accidents and contingencies admitted to result from the practice of the former are far more likely to arise from the greater local and constitutional disturbance consequent on the practice of the latter; and that if half the intelligence, care, and circumspection formerly bestowed on small-pox inoculation were devoted to the practice of vaccination, the results would be far more satisfactory in all respects.

But the judicious and skilful performance of vaccination ought never to be attended with pernicious effects, and the occurrence of harmless or avoidable accidents inculcate only the necessity of greater attention, but constitute no valid objection to a practice so fraught with benefits to mankind.

NOTES on the SECURITY given by VACCINATION, and on certain Objections urged against its Practice.—By Dr. FROSCH, Public Vaccinator to the Town and Commune of Wittingau, in Bohemia.

1st Proposition.—Vaccination protects from attacks of small-pox, under certain restrictions, during the whole life of the individual.

For the attainment of that end, it is necessary that attention should be paid to certain rules, which will be enumerated below, and which the author of this paper guarantees as effectual, grounding his assertion upon the large number of 28,000 vaccinations and 2,000 re-vaccinations, which he practised with his own hand, in his official capacity.

(1.) An effectual and conscientious fulfilment of duties on the part of the vaccinator, combined with scientific zeal and attentive examination of the individual from whom the vaccine matter is taken.

(2.) Originally fresh and fluid vaccine lymph, inoculated upon perfectly healthy and vigorous children, during the warm period of the spring.

(3.) Well-timed charging of the lancet with the vaccine lymph, and transplantation of the same from one individual to the other, from arm to arm, in the fluid form, on the seventh or at the most on the eighth day. Under such circumstances, two punctures upon each arm are sufficient.

(4.) Each punctured spot should rise on the fourth day; whereupon reaction, accompanied by slight fever, appears between the fourth and fifth day of infection. Each raised spot, from the fifth to the seventh day, turns into a pustule of the size of a pea, which is filled with clear lymph, and surrounded by an inflammatory areola one inch and a half in diameter.

(5.) The pustules thus produced should collapse between the ninth and tenth day, and dry into a horny blackish scab, which falls off from the twenty-first to the twenty-fifth day, and leaves on the skin a circular, radiated and whitish cicatrix, in the middle of which a little fossa is observed, which latter persists through life.

Vaccination, practised in the above manner, has proved completely protective of natural small-pox, and the author finds this assertion of his so firmly based upon the satisfactory and practical facts of his experience of thirty years, that he is enabled publicly to reiterate the following opinion:

Vaccination, conscientiously and properly practised, has afforded mankind the expected and absolute protection against variolous contagion, through the whole existence of the individuals subjected to the operation.

As an additional proof of the truth of the above proposition, the author begs to mention the following experiment:

He vaccinated 200 of his patients (who had been subjected to vaccination in the first months of infancy) when they had attained from the tenth to the fifteenth year. The result was a dry, reddish papule, which, after a little titillation, disappeared from the sixth to the seventh day, and left, instead of a cicatrix, merely a little blue mark upon the skin.

There are, however, circumstances when vaccination does not afford a lasting protection, nor guarantee through life against the contagion of small-pox. These circumstances are the following:

The use of vaccine lymph degenerated as to power and intensity (and thus weakened), by—1st, Frequent transplantation; 2dly, by desiccation; or, 3dly, by being taken from an individual whose state of health has not been carefully investigated.

A second infection is in such cases possible, and has actually taken place, as has been proved by experience; but small-pox takes then a milder and modified form, in the shape of a varioloid attack.

The latter is to be looked upon as true small-pox (though much weakened), because it has sprung from the same seed, relatively stunted by imperfect vaccination. The seed has thus produced an altered fruit, through the diminished susceptibility of the organism respecting the influence of contagion, the varioloid affection representing a mezzo-termine between the true and the so-called false small-pox.

The possibility of a gradual weakening of the protective power, and a return of the susceptibility for the contagion of small-pox, after an incomplete vaccination, are therefore not to be doubted and cannot be denied.

But although the above-mentioned incomplete vaccination does not afford a lasting protection, and a perfect guarantee from infection; and although the influence of the vaccine virus goes on becoming weaker and weaker, it must not be assumed that vaccination is worthless; because small-pox, occurring under such circumstances, is not, in general, fraught with any peril. Its course is then mild, almost apyretic; the eruption is papular or tubercular, and does not produce any cutaneous destruction or scars, because pus is rarely formed; and we have none of the fever which is usually connected with the formation of purulent matter. In short, small-pox assumes a milder character, and re-vaccination, may hence be looked upon, when practised upon incompletely vaccinated individuals, as a desirable, advantageous, and hygienic measure.

Now, as the cause of the non-removal of the susceptibility lies, as has been stated above, principally in the use of imperfect, stale, and therefore spoiled vaccine lymph, or in the incomplete cow-pox infection of the patient, his organic susceptibility not being destroyed, we must, keeping in view practical experience, consider re-vaccination as the most satisfactory protective means against the casual infection which may occur under the unfavourable circumstances just alluded to.

The happy results of vaccination and re-vaccination are acknowledged in the humblest classes of society, and the operation is by them eagerly sought for. The people at large highly approve of the vaccination of their children, even when incomplete, partly as a protection against natural small-pox, or at least as a means of diminishing the severity of that disease; because the children are thus saved from the disfigurement of small-pox pits, and even rescued from death. We thus find every one extremely willing, in the whole of Bohemia, to get such children re-vaccinated, with whom vaccination has taken no effect.

It was at one time erroneously suspected that vaccination predisposed to various diseases, as scrofula, syphilis, scarlet fever, rickets, hooping cough, &c., &c.; but extensive experience has set these fears at rest. It is, however, not to be denied that syphilis or scrofula may be transplanted both by irrational modifications in the steps of the operation, and carelessness and ignorance on the part of the medical men entrusted with this doubtless important and useful branch of practice. Hence we must insist upon a careful examination of the individual yielding the lymph, when the latter is to be obtained and transplanted. Sickly children should not be vaccinated at all; and no lymph is, *à fortiori*, to be taken from children in a similar condition. We should, moreover, pay especial attention to the prevailing morbid tendencies of the times.

The author begs, in conclusion, to observe that there are sometimes unfavorable years, in which either certain reigning diseases, or the nature of the lymph itself, have a perverting influence upon vaccination. The results of the operations in the year 1847 may here be cited as an example.

In the year 1847, 121,837 children were vaccinated in Bohemia. Of these children 113,120 presented the true, and 2,101 the false vesicle; and vaccination had no effect upon 6,616 of these infants.

The unfavorable results were principally due to the epidemic of eruptive diseases which broke out in that year; none of the children who had had the true cow-pox vesicle was, however, attacked with the actual small-pox.

OPINION on VACCINATION.—By Dr. HAMERNIK, of Prague.

IN answer to the question "whether vaccination protects, in most cases, against small-pox, and in general prevents the latter disease from proving fatal," I have, before giving a reply, to make a few statements in order to elucidate the relations existing between cow-pox and small-pox.

Cow-pox is a morbid state peculiar to the animal just named, and characterized by a crop of pustules. It reigns sometimes epidemically among cows, as small-pox does among human beings; and may be transplanted, by means of inoculation, from cows to the human subject, and vice versâ, under certain not well ascertained circumstances.

Setting aside the rather credible accounts of such an inoculation handed down to us, not only from the ancients, but also from very remote eastern records emanating from India and China, we find that the first punctures with cow-pox virus were made by Jenner upon man, May 14, 1796.* Jenner thought it necessary, in pursuing his investigations, to admit that the vaccine matter was identical with that of the small-pox as developed upon human beings, and hence called cow-pox, *variola vaccina,* which denomination was thought correct by subsequent, even now living, but not unprejudiced observers.

It is, however, found that cow-pox and small-pox present pustules of a different kind, as proved by their physical characters, and by the results of the inoculations made with the matter they respectively secrete. When cow-pox is inoculated to man, we observe that each puncture produces a pustule; the so-called supernumerary pustules also arise by means of inoculation, for they spring up on denuded or irritated cutaneous surfaces by the contact of the pocky matter. But a general eruption of pustules over the whole body has no relation with vaccination, and is to be looked upon as an accidental variolous combination. Cazenave and Schedel (Abrégé Pratique des Maladies de la Peau, Paris, 1838), express themselves as follows respecting these general eruptions: "Ce sont des varioles très légères." Cow-pox can be transplanted upon other human beings with its peculiar characters, and also back again upon the udder of the cow. Not so with small-pox: for the transplantation of the variolous matter from one individual to the other (a procedure known by the name of *inoculation*) not only gives rise to specific pustules, but also (not unfrequently after a single puncture) to a more or less extensive eruption of pustules over the whole body. Small-pox cannot in any way be transmitted to the cow; but the inoculation of small-pox matter upon the udder of that animal may, in rare cases, produce a pustule different, however, from the cow-pox pustule.[*] If the matter of the former be inoculated back again upon man, we may have a more or less general variolous eruption. When inoculations are made with a mixture of cow-pox and small-pox matter, two kinds of pustules will be the result; a vaccine pustule on the site of the puncture, and a variolous eruption over the body (Bousquet, Traité de la Vaccine, &c., &c., Paris, 1833). We can, however, hardly help feeling surprised that Jenner advocated the use of the cow-pox matter, and repudiated the inoculation of the pus of small-pox, seeing that he considered both affections of an identical nature.

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* An Inquiry into the Causes and Effects of Variola Vaccina, London, 1798.

The immediate and visible results of vaccination are not constantly the same, nor have the causes of its taking effect or not been as yet clearly determined. Vaccination is generally successful with children up to the second year; but it acts upon hardly one third of adults, or of persons of mature age who are subjected to the operation. This last-named proportion was ascertained after the so-called re-vaccinations; and it is quite erroneous to ascribe such ill success to former vaccination, or to the previous occurrence of small-pox in the individuals, as no better result is obtained with adults whether or not they had previously been vaccinated, or suffered from small-pox.

The latter disease presents several forms which have erroneously been called, "*variola vera, modificata* (*varioloïde*) *varicella*, &c., &c." which terms have proved of some advantage to the false doctrines connected with vaccination. All the statistical data of cow-pox and small-pox, based upon these subdivisions, are worthless.

Variola has been observed under the following forms:—Umbilicated pustules (to be seen in variola vera and varioloïde), globular and conical pustules (seen in the above-mentioned varieties), papular elevations (ibidem), vesicles (chicken-pox, vel variola vesiculosa, generally called varicella). All these may appear under the influence of the same cause.

It is now put beyond a doubt, that these different forms of small-pox are of the same nature, that they occur simultaneously upon the same individual when the eruption is extensive, that they represent different degrees of the same disease, and that severe cases of variola may be produced by inoculating either the so-called vesicles (chicken-pox or varicella) or the umbilicated or globular pustules, (Rayer, Traité des Maladies de la Peau). It is likewise a great mistake to suppose that small-pox presents different characters according as persons have been vaccinated or not, or have suffered or not from variola.

Hence, the terms "variola vera, modificata, varioloïde, varicella," &c., &c., should not be used at all, as being quite incorrect denominations based upon entirely false assumptions. We should simply say "variola," which general term might be qualified by mentioning the number of the pustules (a matter of great importance), and adding whether they are umbilicated, spherical, conical, or simply vesicular or papular. This system seems to me much more advantageous than the classification proposed by Gregory.

In order to learn what influence the cow-pox has on small-pox, or whether it has any at all, we must investigate, First, what relation these two affections have to one another when they are seen upon the same individual; Second, the characters of small-pox before and after vaccination; and, Third, inquire whether the doctrine of Jenner is not opposed to acknowledged pathological principles.

1. Let us first examine the relations or mutual influence of small-pox and cow-pox when seen upon the same individual.

It has been noticed, that vaccinated persons may be attacked with small-pox, either during the development of the cow-pox pustule, or a few days after the drying of the same. I have myself observed such cases. Legendre mentions four cases that came under his care (Du Développement simultané de la Vaccine et de la Variole, Archives Générales de Médecine, 1844), and adds several cases of Sédillot, Duplan, Lisfranc, Cousture, and Herpin, where children died of small-pox soon after being vaccinated ("faits dans lesquels on voit de jeunes enfants succomber à la variole peu de temps ou immédiatement après avoir été vaccinés").

In the present state of opinion respecting vaccination, it is impossible to lay down rules respecting the measures to be taken in epidemics of small-pox; hence we should not be surprised to hear of the most diametrically opposed views on this subject. On the one hand, we find Husson calling the omission of vaccination a crime, when epidemics of small-pox break out, (Recherches Historiques et Médicales sur la Vaccine, Paris, 1801. Dictionnaire des Sciences Médicales, 1821); and on the other, Legendre, who says we should refrain from vaccinating young children during an epidemic of small-pox ("il faut bien se garder de vacciner des enfants tres jeunes"); because cow-pox, under such circumstances, favours the development of small-pox ("la vaccination ne parait propre qu'à hâter l'évolution de la variole"). I am convinced, however, that vaccination can neither prevent nor give rise to small-pox, the two affections have no connexion; and I consider, therefore, both the above-mentioned opinions as erroneous. Rilliet and Barthez (Traité Clinique et Pratique des Maladies des Enfants, Paris, 1843) agree with Legendre, and condemn vaccination during epidemics of small-pox, because cow-pox does not prevent the development of small-pox, and is likely to disturb the regular course of the latter ("semble exercer une perturbation fâcheuse"). In fact, it is not rare to find cow-pox and small-pox luxuriating together upon the same individual.

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[*] For the last fifteen or sixteen years, a large supply of vaccine lymph has been furnished in England by the frequent repetition of proceedings which Dr. Hamernik considers impossible.—J.S.

According to Woodville, Bousquet, and others, the two exanthems do not in such cases militate with one another as to development and progress, and both take their ordinary course. When vaccination is resorted to during the first days of an epidemic of small-pox, both exanthems, in the opinion of Guersant and Blache, go on in the usual manner without disturbing one another (" sans exercer la moindre influence l'une sur l'autre"). Gillette (Des Anomalies de la Vaccine, Journal de Médecine, 1843) says that the earlier eruption usually stifles the later, or at least prevents its development (qui a la priorité d'infection étouffe l'autre, ou en amoindrit les effets").

The truth of the matter is, that a pretty extensively spread epidemic of small-pox often prevents the development of the cow-pox, which circumstance agrees perfectly with the Hippocratic aphorism: " Duobus doloribus simul obortis—vehementior obscurat alterum," exactly as happens when other diseases simultaneously attack the human subject.

We learn from all well marked small-pox epidemics, that cow-pox does not protect from small-pox, even after repeated vaccination; and that the two affections have no relation whatever with each other.* And in this respect I fully agree with the doctrines of Dr. Thomas Brown.†

Confidence in vaccination has been much shaken in England by the epidemics of 1825,–38,–40 and –41, and I cannot understand how Dr. Brown could propose the use of inoculation after having so warmly and correctly spoken respecting the giving up of vaccination; just as if nature could be sported with in this (to say the least of it) harmless manner! Vaccination proved likewise useless in the epidemics of Paris (1825) and Marseilles (1828); and it is hardly to be doubted that vaccination would long ago have been abolished if people could, in other countries, as is the case in England, freely express their opinions; and if it were not the interest of appointed vaccinators and other officials to keep the practice of vaccination in statu quo.

There is no value in the statement that incipient epidemics of small-pox were arrested and rendered milder by rapid vaccinations and re-vaccinations, except medical men could control the accuracy of their verdict, as lawyers do, by a new trial. Until they can do that, we must admit that there are individual cases and epidemics of small-pox which prove either light or severe, this having been the case before vaccination, and being likely to continue so, much longer than vaccination will last.

Jenner himself learnt that vaccination was not protective against small-pox (Further Observations on the Variola Vaccina or Cow-pock, London, 1799; his first work, to which I have before referred, was published in 1798!), and the author ascribes his bad cases to the use of imperfect cow-pox matter!! Indeed, the complaints about the unsatisfactory or nugatory protective powers of the cow-pox are as old as vaccination itself; nor will the attempts at changing the cow-pox matter, the re-vaccinations, the use of numerous punctures, and their frequent repetition, help to put erroneous doctrines upon a better footing.

Dr. Thomas Brown says, very justly (loc. cit.), " Re-vaccination will not be able to accomplish what vaccination could not do." I have already stated that the cow-pox matter very seldom took effect upon adults, and that this circumstance could not always be explained by a previous vaccination or attack of small-pox. I may add the fact, that re-vaccinated individuals, upon whom the cow-pox matter took effect, or the contrary, have been seized with small-pox, and that many died of the disease like other people. This is proved by the official results of re-vaccination in the armies of Wurtemberg and Prussia (Heine, Wurtemb. Med. Corr. Blatt. 1834; Lohmeier Med. Zeitsch. 1835). In these official returns there are statistics respecting already vaccinated and non-vaccinated individuals, the natural and modified small-pox, &c., &c.; but I attach no importance to these particulars, because this classification is more or less gratuitous; and because things are admitted in tables like these which are likely to be palatable to gentlemen high in office. Re-vaccinations among civilians are in this country extremely rare, hence I am unable to quote many cases. I only saw two persons who had been re-vaccinated die at the hospital of this city,—a Russian officer in the guards, and a physician from Bremen.

2. I shall now examine the characters of small-pox before and after vaccination.

If vaccination really possessed the properties ascribed to it, a change must long ere this have taken place in the character of small-pox, both of the sporadic and epidemic kind. Historians mention that small-pox made many victims in India and China in very remote times, and that the disease again disappeared for the lapse of many centuries. Such records have also come down to us respecting other diseases. Just as many individuals of the animal and vegetable kingdoms have disappeared in the course of time, so also have great changes taken place in the number and severity of diseases. Small-pox has been minutely described by pathologists before vaccination was introduced, and in such a manner that one would think they had seen the disease in the wards of our hospitals. Indeed, the best pathologists of our own time, who have paid especial attention to small-pox, agree that they could add nothing to the descriptions of the following authors:—Rhazes (who died at Bagdad A.D. 930, and who went by the name of the Wise), De Variolis et Morbillis, Arabice et Latine; Laudani, 1768. Thos. Sydenham, Observationes Medicæ circa Morborum Acutorum Historiam et Curationem; London, 1675. Rich. Mead, De Variolis et Morbillis Liber; London, 1754. John Huxham, Opera Physico-medica; 1764. Morton, &c. &c. Richard Mead admits a light and severe small-pox, and Huxham has observed such slight epidemics that no fever appeared in the whole course of the disease. At present, pathologists could hardly class such cases with the variola vera; they would, perhaps, call it a variola modificata par excellence, and such cases would figure in the tables as varioloïde, although no signs of cow-pox could be traced in connexion with them, this being simply done in order to square the register satisfactorily. Sydenham noticed that small-pox reigned epidemically almost uninterruptedly from 1667 to 1675, which circumstance would appear rather surprising to an observer residing in a smaller town or in the country, as compared with the present state of things. In large cities like London, Paris, Vienna, and even Prague, it is noticed that small-pox never entirely disappears; the disease has always steadily persevered, and from time to time presents exacerbations.

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* See statistics in the third section of the preceding letter, and the statements there quoted from Dr. Thomson with respect to small-pox in Scotland, from Mr. Cross with respect to the epidemic in Norwich, and from M. Bousquet with respect to that in Marseilles.—J. S.

† An Investigation of the present unsatisfactory and defective State of Vaccination, &c., &c. in a Series of Letters to Dr. George Gregory, Edinburgh and London, 1842.

It may be that in former centuries small-pox assumed more frequently the malignant or hæmorrhagic type than it does now; but this circumstance can in no wise be explained by the intervention of vaccination. Scurvy, putrid fevers, dysentery, &c. &c. appeared more frequently in those times, and hence the similar and not unfrequent type of small-pox. This state of things seems to have been owing to retarded civilization, to poverty and scarcity, which were spread almost generally over the whole continent. An inferior state of social culture goes hand in hand with pauperism, want, and hunger, and is characterised, in the history of medicine, by a proportionate frequency, gravity, and diffusion of various diseases.

It may, finally, be assumed that small-pox, like other diseases, was rendered more fatal by formerly prevailing methods of treatment. If the medical men of those periods had adhered to the simple opinions of Rhazes, which Sydenham fully adopted, they would not have laid themselves open to the above reproach.

I may just mention that medicines were hardly used at all whilst the small-pox ward of the hospital of this country was under my care. The therapeutic measures were confined to the following:—careful ventilation of the wards; almost daily change of bed and body linen; cool acid drinks (lemonade); two or three cups of good and clear beef tea or boiled milk, and frequent enemata of cold water, except the latter were contra-indicated by severe diarrhœa. All these were used during the stage of increased calorification—the period of increased chemical changes and secretions. At the close of the feverish state, or when the eruption had well come out, we employed ablutions with lukewarm water (from 86°—90° Fahr.); when the eruption was very copious in the face, the same warm applications were continued, but a little cooler (77°—86° Fahr.) in the shape of compresses over the face. At the same time the patients had a generous diet: at first milk and boiled eggs, and then meat either boiled or roasted. As to actual medicines, they were had recourse to only in rare cases, in the shape of an opiate in diarrhœa or restlessness.

The results of these measures were so surprisingly favourable that the latter must be looked upon as superior to all methods of treatment hitherto known. The recoveries were very speedy, and the deaths less than 5 per cent.*

It has been maintained that the small-pox pits in the face are very seldom seen since the introduction of vaccination. The mechanism by which those pits or marks are formed has only recently been known. They, namely, arise from the so-called corrosive properties of the matter contained in the pustules (or exudation), by which the cutis vera is more or less cauterised, the cutaneous wounds healing, after the recovery of the patient, into the well-known cicatrices.

Opportunities are generally afforded to study these lesions of the face upon the dead body, as patients often die when the matter contained in the pustules is of the kind above mentioned. It is impossible now to ascertain whether such pustules occurred relatively oftener in former times than they do now; although what has been said above of the relative malignancy of small-pox seems to answer the inquiry in the affirmative. Vaccination has, however, had no share in the result.

Rhazes states that he had found means to prevent the disfiguring cicatrices of small-pox (lukewarm baths and compresses of lukewarm water on the face); this circumstance clearly proves that, in his time, the malignant kind of pustules was but seldom observed. That small-pox sometimes ran its course with or without cicatrices, is shewn by the fact that medical men have at various periods tried and recommended means for the same purpose which they considered very efficacious.

The measures advocated in our own times for the same end, viz., the puncturing of the pustules, cauterization, mercurial ointment, various plasters, &c., are far inferior to the means used by Rhazes, and are more or less destructive; still the very remedies show that the pustules above described are not at all seldom met with in our own days.

I must finally allude to a most important circumstance. Pathologists call small-pox a contagious disease, without telling us what this contagious character really means. Rhazes, known as the Wise all through the East, is the only author who does not mention this contagiousness which has been so warmly defended. Rhazes very naturally found, with other observers, that small-pox sometimes reigned epidemically and again disappeared for a protracted period; and that the disease was sometimes of a severe, sometimes of a slight character. Rhazes must, moreover, have noticed that when small-pox broke out, it made victims in various families unconnected with each other; and it is possible that he found it quite natural that several members of one family could or even must be seized in succession; and that it is more difficult to explain why *all* the individuals belonging to one family are not visited with the disease as well as the first, seeing that they live under the same influences. If we knew, in such cases, why the first person attacked had been singled out, and why, as a rule, all the individuals of one family do not suffer from the disease, it would most probably be easier to explain why certain persons are attacked. If it were known, respecting any given epidemic (variola, scarlatina, cholera, puerperal fever, &c.), how and why the first person is attacked, why the rest of the community are not thereupon seized with the same disease, and how it is that every epidemic at last disappears from its own accord, the erroneous theories of contagion, miasmata, and the so-called infection, would perhaps have not been broached at all, or would long ago have been abandoned. These theories are, in fact, the expression of our complete ignorance respecting the mechanism of the spreading of diseases.

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* Dr. Hamernik does not mention whether the patients among whom this low mortality prevailed had been *vaccinated*. For aught that appears to the contrary, his cases may simply have illustrated the fact (which he denies) of the remarkable mitigation of small-pox when it attacks vaccinated persons. Among *the best-vaccinated patients* of the London Small-pox Hospital for twenty years the death-rate has been only one tenth part as great as that which Dr. Hamernik considers to have been his unequalled success. Further, as Dr. Hamernik classes *varicella* with *variola* under the one name of *small-pox*, it would be desirable to know how many of the cases observed by him were cases which other practitioners would have called by the unalarming name of *chicken-pox*.—J. S.

I have discussed these matters in my work on the cholera.* We are acquainted, up to the present period, with two diseases which may, by means of inoculation, be transplanted from one individual to another:—small-pox and syphilis. It is by this faculty of transplantation that I would explain the continued prevalence of these diseases. But small-pox differs from syphilis in the following particulars:—Small-pox breaks out and spreads like other epidemics (scarlet fever, typhus, cholera, &c.), through causes with which we are entirely unacquainted; it can besides be inoculated with the lancet; and may also, as it were, be inoculated upon the respiratory mucous membrane by the inhalation of the volatile portion of the pustules. The latter supposition is based upon the following facts:—Small-pox shows an infectious character only at the desiccating period; patients may at this stage be distinguished by the odour they exhale around them, and the air thus impregnated with small-pox materials may in that state be conveyed at a distance. This latter fact has been observed in the wards of Professor Hebra, of Vienna, where those wards which in the physicians' rounds are visited *after* the small-pox wards, suffer in proportion to the order in which they are visited. Hence, I consider the contagiousness of a complaint of the same signification as the ascertained possibility of propagating the same by inoculation; where there is a doubt respecting this possibility, contagiousness is out of the question. In cases of this kind we shall remain in ignorance of the mode of propagation of such diseases, as long as we are unacquainted with the manner in which the first persons are attacked; as long as we do not know why all the people who come in contact with the patients do not suffer from the disease; and why, as a rule, a time comes when the epidemic falls of itself, at a period when such an event was hardly to be expected, and when, in fact, restrictive measures had almost been given up.

The doctrine of the so-called contagiousness of diseases has done much mischief, like all erroneous notions on important subjects; and this doctrine, being false, can at no period have done any good.

It is then my firm opinion that small-pox spreads in two ways, epidemically and by inoculation, the latter being often effected by simple inhalation; therefore it must remain doubtful, in given cases, whether the disease has spread in the usual epidemical manner (the contact of the sick with the healthy being here of no moment), or by means of inoculation. I will finally and merely cursorily mention, that nothing positive can as yet be said respecting the effects of inhaling air in the vicinity of patients affected with syphilis, especially because no investigations have been undertaken in that direction.

3. We have finally to examine whether the doctrine of Jenner is not opposed to acknowledged pathological principles.

Observation has taught us that two severe diseases cannot affect an individual at the same time. Thus it is that typhus cannot go on with scarlet fever or small-pox upon the same patient at the same time; thus we do not find people suffering from tuberculous and cancerous disease at the same period, nor can any more tuberculous deposit take place with a pretty considerable mitral narrowing. This, however, holds good only in reference to severe diseases, and such as affect the whole organism; whilst more or less trifling affections or mere local ones can exist along with any pathological change whatsoever. Cowpox belongs doubtless to the latter category (trifling affections), and experience teaches us that, during its development, the best marked diseases may contemporaneously pursue their regular course, such as small-pox, scarlet fever, acute bronchitis, pneumonia, typhus, dysentery, &c. &c., according to the season and the epidemical tendencies. We find, by observation, that the cowpox, under such circumstances, continues without assuming any important character; and that the diseases above mentioned take their course as they would with other individuals.

When the cowpox has altogether left the patient, we see that the scars of the punctures have no more influence on the diseases which may subsequently attack him than other scars resulting from an analogous cutaneous lesion.†

I consider it as a general pathological law that morbid actions which have entirely run their course can have absolutely no influence whatever upon the subsequent pathological reactions of the individual.* This is abundantly shown by experience; and hence it is not impossible that one individual may repeatedly suffer from small-pox, scarlet fever, typhus, pneumonia, tubercular disease, &c. &c. Nay, small-pox has been observed five different times upon the same patient. As much may be said of all other diseases. Thus it not seldom happens that, after recovery from tubercular disease, cancer makes its appearance; and it should be observed that deposits of cancerous matter may take place at the very outset of the absorption of the tubercles. Keeping these incontestable pathological facts in view, it becomes a matter of indifference which were Jenner's doctrines respecting the nature of the cowpox; whether he considered the latter identical with the small-pox or not—whether he looked upon it as an antagonist of the small-pox or anything else. Nor can small-pox inoculation be for a moment advocated, if we pay attention to these same pathological laws. A variolous attack, when once passed away, has no more influence, as regards future events, than any other disease.† Since we know that the inoculation of the poison of varicella has given rise to very severe small-pox, as has been seen by the celebrated De Haen (Refutatio Inoculationis), not a word can be offered in defence of inoculation. The cause why many individuals escape small-pox altogether, why some have it even twice, why the inoculation of the disease sometimes takes no effect, why variolous evaporations may by some be inhaled with impunity, is entirely concealed from us. As the cowpox is a disease foreign to man, it is particularly for graziers that further investigations can be interesting. Physicians have attempted to cure other diseases by means of the cowpox, but this only shows the slender confidence which medical men had in the means at their command to support their opinions respecting the powers of vaccination.

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* Die Cholera Epidemica; Prag, 1850.

† See back, p. 19, Mr. Marson's Table IV.—J. S.

Second Question.—Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of any other infective disease, or of phthisis; or that their health is in any other way disadvantageously affected?

It may be inferred, from what I said above, that there is something assumed in this question, which should be proved before the latter can be put or answered; viz., that vaccinated persons are less exposed to small-pox than others. By the manner in which the question is asked, it would appear as if, at the breaking out of every epidemic of small-pox, the number of people who would be attacked were known beforehand; and as if the epidemic itself could be modified at will by the instrumentality of vaccination. But I beg to submit that the above-mentioned assumption is perfectly gratuitous, because epidemics of small-pox return at greatly varying periods, and present different features as regards peculiar characters, the number of attacks, the length of time the disease reigns, and the ratio of its spreading; because vaccinated and not vaccinated persons suffer from the disease during every epidemic; and because the influence of vaccination can be observed neither from the character or progress of individual cases. I am aware that the assumption alluded to is based upon the results to be found in the registers of public vaccinators, but I freely confess that I consider these books as perfectly valueless; and I may add that the most intelligent of the gentlemen who keep them fully concur in my opinion. In this country we know full well how vaccinators are situated; and that little confidence can be placed in them, is generally acknowledged. I must answer the second part of the question in the negative. No disease can be conveyed from one person to another by means of vaccination, except such disease is susceptible of being propagated by inoculation. Such, however, is the case in none of the diseases enumerated in the question.

Third Question.—Have you any reason to believe or suspect that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly elected medical practitioner?

I regret that both these questions must be answered in the affirmative.

Vaccination is a harmless operation, provided the health of the child from whom the lymph is taken, and that of its mother, be carefully investigated and found satisfactory in every respect. The operation is, however, of little importance, and no advantage can, in any way, be derived from it. The above-mentioned precautionary measures can, in individual cases, be easily adopted; but where vaccination is practised on a large scale, and where vaccinators have possibly an interest in multiplying the operations, care and attention are no longer possible, and very sad accidents must more or less frequently occur. It is, in the meanwhile, a melancholy fact that even the heads of the vaccination party have circulated doctrines of a kind widely different from those I have just mentioned. Thus we find Taupin (Dict. de Méd. vol. xxx. p. 414) say: L'état maladif du sujet ne modifie en rien les propriétés du virus." The author maintains that his proposition is supported by numerous experiments. Taupin used the lymph taken from children labouring under typhus, scarlet fever, measles, small-pox, itch, inflammation of the brain, chest, or intestines; or suffering from chorea, epilepsy, scrofula, syphilis, tubercular deposits in the lungs, and ringworm; and he states that no harm ever came from the procedure ("n'a jamais communiqué aucune de ces maladies.") And he adds, that the lymph took effect exactly as if it came from healthy children. Landauzy (Journal des Connaissances Méd. Chir. 1841), quite agrees with Taupin. He says that the opinion that the cow-pox lymph taken from unhealthy children must be hurtful to those who are vaccinated with it, is a mere prejudice, and considers fears of that kind as quite groundless. "Cow-pox virus (according to Landauzy, small-pox and cow-pox are identical) has been taken from subjects suffering from local and constitutional syphilis; and it was never noticed that vaccination with it had ever given rise to any primary or secondary symptoms of that disease." I think it will be sufficient for me to remark on this head,' that, to arrive at a knowledge of the amount of mischief which such doctrines were the means of bringing upon mankind, it would be necessary to learn how much the promulgators gained by so unlimited a love for vaccination.

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* If a hundred persons of whom half *have had* measles be equally exposed to the infection of *measles*—or if a hundred persons of whom half *have had* hooping-cough be equally exposed to the infection of *hooping-cough*—do the fifty in either case *who have had* the disease suffer like the fifty *who have not had* it?—J. S.

† "At the Small-pox Hospital (says Dr. Gregory) very few persons ever present themselves who affirm that they have previously undergone *small-pox;* and of the few who do, but a very small fraction can stand the test of rigid scrutiny." Is this untrue? or, if not, would Dr. Hamernik's experience justify (as his argument alleges) that for the word "*small-pox*" the name of any other disease indifferently might be substituted in the sentence?—J. S.

As it has now been proved by experiments that constitutional syphilis may be inoculated by means of the patient's blood (Professor Waller, of Prague) and as blood is often drawn by the careless manner in which the lancet is sometimes charged and inoculated along with the vaccine lymph, no doubt can exist from these facts as to the possibility of doing in this manner a vast deal of mischief.*

Professor Monteggio maintained in a paper read before the Academy of Sciences and Arts of Milan, February 17, 1814, that when a syphilitic child is vaccinated, the result of the operation was a pustule containing both kinds of virus. Gasperi Carioli expressed the same opinion in 1821. Marcolini adduces the following fact:—Catherine Sclibino, two months and a half old, and apparently healthy, was vaccinated. The vesicle rose very well. On June 16, 1814, ten children were vaccinated with lymph obtained from that vesicle, and from these latter thirty others were vaccinated. Catherine Sclibino died at the end of a few months, as well as five of the ten children which had been vaccinated from her. Out of the thirty children vaccinated from the former ten, only seven could be watched. One of these seven children was seized with a malady which it transmitted to its brothers and sisters; and another of the seven had also a few symptoms. The parents of Catherine Sclibino had been a long time suffering from syphilis, but had quite neglected themselves. A few days after vaccination, pustules appeared on the child's body, especially about the vulva, the anus, the throat, the forehead, mouth, &c. &c. The other children had also pustules, ulcerations about the mouth, mucous tubercles about the anus, and the disease was communicated to several nurses who suckled the little patients, and to other children who were nursed with them. A medical man was a short time ago subjected to a severe penalty, in Bavaria, on account of such a vaccination tainted with syphilis.

It would be interesting to inquire whether similar or more terrible accidents have occurred in our orphan asylums, or other vaccination establishments.

Fourth Question.—Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?

It is evident, from all I have said above, that I can by no means recommend a general vaccination of children. No one can control those who practise vaccination, even under the most favourable circumstances; viz., very stringent regulations respecting the examination of the child from whom the lymph is to be taken, and of its mother. And although vaccinators may exercise much prudence in the choice of the lymph, and are very attentive to their work, in the earlier part of their career, we find by experience that these gentlemen cool down considerably with time. An operative procedure by which, in the most favourable cases, there is nothing to be gained, and by which, as shewn by facts, health, nay life, are put in jeopardy, should, under no pretence whatsoever, be recommended.

According to my opinion, Government should, in respect of vaccination, take quite a passive attitude, and entrust the matter to the parishes, in order not to oppose the wishes of the poorer classes. The parish should confide the practice of vaccination to their most eminent medical men, merely as an addition to their other important duties, with instructions that vaccination should be practised upon request, and ever gratuitously, and that no reports need be made, tables drawn up, or certificates given. Government might, besides, to prevent mischief, take measures for obtaining sound lymph, send the same gratuitously upon the request of medical men, and make the latter responsible for a careful examination of mother and child, when lymph is to be taken.

It is clear that, under such circumstances, vaccinations would every year become fewer, until at last we should read with astonishment in the journals of former periods, how much attention was at one time paid to vaccination.

But if the question of vaccination is entrusted, for renewed discussion, to men looked upon as conversant with the subject, and to medical and other officials, it is quite certain that the old system will be carried on, and will become worse; because reforms of this kind have never been effected in this manner. Such a question can be satisfactorily settled only by an uninterested and independent committee, who would have to take cognizance of the simple facts bearing upon the matter. This is, according to me, most easily feasible in England; for "The Times" of November 20, 1856, says very justly: "We consider that our country is destined to hold a place in the history of the world, to which no other country will be able to lay a claim."

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* Dr. Friedinger reports that Professor Hebra publicly inoculated four persons with the blood of patients suffering secondary syphilis, and after 52 days found no result.—J. S.

ANSWERS by DR. HEBRA, Head of the Small-pox Division of the General Hospital, Vienna, and Professor on Diseases of the Skin.

First Question.—" Have you any doubt that successful vaccination confers on persons subject to its " influence, (*a*) a very large exemption from attacks of small-pox, and (*b*) almost absolute security " against death by that disease ?"

This question requires a twofold answer, as inquiries are made, in the first portion thereof, simply respecting the protective power of vaccination against small-pox, and, in the second, respecting the rate of mortality of small-pox when the disease attacks vaccinated individuals.

With respect to the *first portion* of the above question (which, indeed, might also be framed thus, *Does vaccination protect absolutely or relatively against small-pox ?*) the author can only hold the following opinion, the correctness of which has been verified by all observers in every locality ever since Jenner's discovery, viz. *that inoculation with cow-pox matter affords only a relative protection against small-pox.*

The following figures, derived from the author's own observation, may be adduced as proofs of this relative protection (independently of the fact that epidemics of small-pox have been more rare and less malignant since the introduction of vaccination).

By computing the number of small-pox patients who have been treated in the General Hospital of Vienna within the last 20 years, we find that, out of 6,213 such patients, 5,217 had been vaccinated, and only 996 had not been vaccinated. These statistics seem to justify those, who do not believe in the protective powers of vaccination, to conclude that inoculation of cow-pox matter, far from shielding from small-pox, on the contrary increases the liability to take variola; but this would evidently be an erroneous conclusion.

For if we consider that the great majority of the present population have already experienced the boon of vaccination in their youth; and also that we, now-a-days, meet with very few adults who are not vaccinated, we may look upon the 50 unvaccinated persons, who are the yearly average of the above-mentioned total of 996, as a very large number; and these figures would tend to prove that the few unvaccinated individuals, who are as yet to be met with, are more susceptible of the contagion of small-pox than vaccinated persons, the yearly average of which latter may be reckoned at 260.

It would be rational, according to the above statistics, to believe that the liability to attacks of small-pox is the same for vaccinated and non-vaccinated individuals, if the number of unvaccinated persons, as regards the population of Vienna and its vicinity, were to the number of vaccinated subjects as 50 is to 260, viz. as 1 to 5½; or, in other words, if out of every 11 adults 9 were vaccinated and 2 not vaccinated. This proportion does, however, not exist at the present time, and can, in fact, not arise with the regulations concerning vaccination which, for the last 50 years, have been in force all over the Austrian empire.

The query contained in the *second part* of the first question is, *Whether vaccination afford an almost absolute security as to the danger of death from small-pox.*

The author's answer is, *that vaccination in this respect also affords only a relative protection.*

It is well known that the danger, in attacks of small-pox, rises with the fulness of the eruption, and is less, on the other hand, in proportion as the number of pustules decreases. Pathologists have therefore thought themselves justified to admit, since the introduction of vaccination, three species of small-pox, viz. 1st, a severe and dangerous form, characterized by the eruption and slow progress of a great many and confluent pustules—*variola vera.* The opposite to this is the mildest form—*varicella*—which is always benign, and without danger as regards the life or health of the patient, and runs its course with a scanty eruption which is soon dessicated. The form lying between these two extremes is called *varioloïde*, or *variola modificata*, and is characterized (without presenting any settled features) by a more rapid progress, especially when the crusts are falling off, and by a smaller mortality.

Being now taught by experience that, on the one hand, varicella and varioloïde occur more frequently than variola vera with vaccinated persons, and that, on the other, non-vaccinated individuals are more often attacked with variola vera than with the milder forms, we must evidently admit that vaccination has a mitigating influence on the course and development of attacks of small-pox.

Out of the 6,213 patients already mentioned, who, for the last 20 years, were treated in the General Hospital of Vienna for different forms of small-pox, 1,323 suffered from variola vera, 1,475 from varioloïde, and 3,415 from varicella. The proportions with respect to vaccination, were as follow:—Among the 5,217 vaccinated persons, there were 732 cases of variola vera, or 14·00 per cent.; among the 996 non-vaccinated individuals, there were 591 cases, or 59·34 per cent.; whilst, on the contrary, there were 3,203 cases of varicella among the patients who had been subjected to vaccination, viz. 61·39 per cent.; and among those who had not been vaccinated we had only 212 cases of varicella, viz. 21·28 per cent. Variola modificata, which cannot serve as a standard of comparison, as the diagnosis is more or less uncertain, was observed 1,282 times, or 24·57 times in every 100 cases among vaccinated patients; whilst the same form was observed upon only 193 unvaccinated individuals, viz. 19·38 per cent. Variola vera, therefore, attacks more than four times the number of non-vaccinated persons, and varicella three times the number of vaccinated subjects, which proportion is palpably in favour of vaccination. The data respecting the proportionate mortality in small-pox are as follow:—Out of the 6,213 patients who were attacked with variola in the General Hospital

Vienna, 571 died; and out of these latter, 271 belonged to the 5,217 vaccinated individuals, and 300 to the 996 non-vaccinated persons; which figures mean, in other words, that the mortality of small-pox, calculating upon an average of 20 years, is annually 5 per cent. for vaccinated people, and 30 per cent. with unvaccinated subjects; thus, we find that the deaths were six times more numerous with the latter than with the former. The figures speak for themselves, and require no further comments.

Second Question.—" Have you any reason to believe or suspect that vaccinated persons, in being rendered " less susceptible of small-pox, become more susceptible of any other infective disease, or of phthisis, " or that their health is in any other way disadvantageously affected?"

This question may be split into three parts, the queries being the following:—

1. *Whether vaccinated persons are more frequently attacked with other contagious diseases, and, in particular, with typhus?*
2. *Whether scrofula and phthisis are more frequently observed among vaccinated individuals?*
3 *Whether vaccination have in general an unfavourable influence upon health?*

Section 1.—We are taught by the history of exanthematous affections that they have been for centuries a scourge upon mankind, and that epidemics of rubeola and scarlatina swept away hundreds of thousands of human beings before the least idea of cow-pox inoculation arose. Nay, a very opposite conclusion might be come to, and vaccination be given the credit of the improvement, when we observe that measles and scarlatina occur less frequently in this century and run a milder course than in former times, if we did not know that other contagious diseases may break out, both after vaccination and after an attack of small-pox, and that therefore neither vaccination nor small-pox can protect against measles, scarlet fever, typhus, &c., &c. Those who are aware that cow-pox, sheep-pox, and small-pox arise from the same virus (a fact sufficiently proved by the experiments of Thiele, Ceely, Gessner, Reiter, Bousquet, Ivanovics, and others), will not expect that the inoculation of cow-pox should, any more than variola, protect from other diseases. The effects of different kinds of virus cannot spring up simultaneously; they *never* appear at the same time upon the same individual, but may immediately succeed each other.

Vaccination can, therefore, neither give rise to, nor protect from, measles, scarlet fever, or other contagious diseases; it has in fact no action either way respecting these zymotic affections.

As regards typhus in particular it would be necessary, in order to discover its relation to vaccination, to find out, by statistical researches, whether more human beings were attacked by that disease before or after the practice of vaccination was introduced. It would, however, be difficult to frame correct statements, on account of the varying nomenclature of disease in use at different periods, independently of the other obstacles to and imperfections of such a labour; for it would be a great mistake to conclude that typhus really is a disease peculiar to modern times simply because the term typhus is more rarely met with in nosologies and tables of mortality of former periods than the present. For it is well known that our ancestors made a distinction between their nervous, putrid, asthenic, adynamic, variable, cerebral fevers and typhus; nor is the actual meaning of typhus so generally understood and settled that no room is left for such fevers as the mucous, pituitous, nervo-gastric, typhoid, miliary, &c., &c. mentioned by some physicians.

The great revolutions which have taken place in medicine, and which were the result of unbiassed observation by the bedside and in the dead-house, have set aside a great many useless names of diseases, and have only left such terms as point out different morbid phenomena. As therefore pathological anatomy has proved that the diseases in question, formerly designated under different names, are not affections differing from each other, but simply cases of typhus modified by degree of severity, locality, and extraneous circumstances, the term typhus has obtained a more extended signification, and is at the present period much more used than in former times. That no affinity, however, exists between typhus and the inoculation of the cow-pox is proved by the circumstance that typhus occurs seldom in infancy, viz.:—in the first or second years, a period when vaccination is, in this country, generally practised; whilst the number of typhus cases increases with older subjects when, as it were, the protective powers of vaccination against small-pox gradually diminish.

Section II.—The author must observe, respecting the next query, " whether the liability to scrofula and tubercular affections increases through vaccination," that it cannot be contested that the febrile excitement which is produced by the inoculation of the vaccine lymph (which excitement can, as is well known, be observed by means of the continued frequency of the pulse a long time after the completion of the phases of vaccination), may exert an evil influence on an already existing morbid state; but these trifling disadvantages are too unimportant, when compared with the great protection afforded, to deserve any especial consideration.

The assertion frequently made, that, in our days, after vaccination has been practised for half a century (a practice which annually preserves the life of more than half a million of individuals), scrofula, tubercular affections, and phthisis occur evidently more frequently than before the introduction of vaccination, may be explained in two ways. In the first instance, from the circumstance that the population of our country has considerably increased, as the inhabitants are no longer being decimated either by wars or very destructive epidemics; and that the number of sick is therefore greater than formerly. In the second instance, from the fact that the very practice of vaccination protects from small-pox a great many scrofulous, tubercular, and ricketty children, who otherwise would undoubtedly have fallen victims to variola.

The perpetuation of these morbid constitutions is besides entirely owing to transmission from parents to children and grandchildren; nor was the appearance of these hereditary diseases prevented by postponing or entirely omitting vaccination, in many places, by way of experiment, with the scrofulous or ricketty children of such families.

Section III.—As regards the other unfavourable results which may follow the practice of vaccination, they are limited in the great majority of cases to local disturbances directly produced by the inoculation of the vaccine lymph; as, for instance, inflammation of the follicles and cutis vera, exudation and suppuration. Unpleasant symptoms, such as erysipelas, gangrene, and abscess, are only to be observed in exceptional cases; these symptoms are to be looked upon as unavoidable accidents, and they usually have no detrimental influence on the future state of health of the vaccinated subject when they have been found amenable to treatment.

Third Question.—" Have you any reason to believe or suspect, (*a*) that lymph from a true Jennerian " vesicle has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vacci- " nated person; (*b*) or that unintentional inoculation with some other disease, instead of the proposed " vaccination, has occurred in the hands of a duly educated medical practitioner ?"

This widely grasping question requires several separate answers, because queries are made,—

1. *Whether the lymph of a vaccine vesicle may, besides its peculiar virus, contain another infectious principle, ex. gr. that of syphilis ?*
2. *Whether constitutional non-infecting diseases, as, for instance, scrofula, may be transmitted by the inoculation of cow-pox matter ?*
3. *Whether a vaccine vesicle possess such characters that it may easily be distinguished from other similar vesicles, blebs, or pustules ?*

Section I.—The transmissible infectious principles which have hitherto been recognized, by means of inoculation, are, the syphilitic virus contained in the pus of a chancre; and the virus contained in the cow-pox vesicle, and small-pox pustule. The question therefore simply is, whether these morbid poisons have ever been mixed? Whether inoculation have ever taken place with such a mixture? And what results were obtained by such an operation? It is well known, that compendious answers have, for some time past, been offered to these questions. These answers were given, in the year 1855, at the General Hospital of this city (Vienna), and were published in the numbers for March and April of the Journal of the Vienna Society of Physicians (Zeitschrift der K. K. Gesellschaft der Aerzte). These answers agree in the following respects:—

Inoculation with secretions of this kind, viz., containing, as it were, several special poisons, either produced no effect at all, or only generated a chancre, by inoculating a mixture of pus from chancre and vaccine lymph; and only cow-pox, by inoculating a combination of vaccine lymph and blennorhagic matter. Hence one morbid state only was produced, either cow-pox or syphilis; the latter circumstance being a proof that both poisons are not *simultaneously* transmissible. This opinion is supported by the experience of Heim, Ricord, Bousquet, Taupin, Landouzy, Friedinger, &c.

Section II.—It is maintained in many quarters that the blood of persons suffering from secondary syphilis may serve as a vehicle to the infectious principle; but were even this theory found correct, it would have no prejudicial effect on the practice of vaccination; because we know, from experiments made for the purpose (Heim), and from accidental inoculation, that, regardless of the quality of vaccine lymph, the latter may be inoculated from syphilitic upon sound individuals; and, on the other hand, from sound subjects upon such as are under the influence of systemic syphilis, without propagating syphilis along with the cow-pox.

What has here been proved of syphilis must, *à fortiori*, hold good as regards other constitutional morbid states, as direct inoculations with the secretions peculiar to these diseases have always yielded a negative result.

But although it is abundantly proved that scrofula, tubercular affections, rickets, cancer, and other blood diseases cannot be transmitted by means of their own secretions, or along with vaccine lymph, we should nevertheless, if possible, avoid vaccinating diseased persons; because experience has taught us, as regards adults and children, that the phenomena of vaccination may awake, i.e., render worse, dormant affections; and that, moreover, the cow-pox vesicle easily degenerates upon such individuals. These latter vesicles are nevertheless adapted for further propagation, even when they take an imperfect development, because a positive result, a regular development of the vesicle, and sufficient protection against small-pox have been observed in cases where vaccine lymph was transferred from weakly, scrofulous, and ricketty subjects upon perfectly sound individuals.

Section III.—Every morbid appearance on the cutaneous envelope has its own peculiar characters, by which it may be distinguished from other similar phenomena; the vaccine vesicle presents, in the like manner, sufficiently striking peculiarities as to form, size, number, locality, and particularly as regards its course, to enable the observer easily to establish a distinction between the same and other vesicular, bullar, or pustular eruptions.

But the diagnosis of the vaccine vesicle does not require such extensive knowledge that the latter may not be expected to be possessed by every properly educated medical man.

Fourth Question.—" Do you (assuming due provisions to exist for a skilful performance of the operation) " recommend that, except for special reasons in individual cases, vaccination should be universally " performed at early periods of life ? "

This question might be rendered shorter and more precise in the following manner :—Should children be vaccinated in the first weeks or months of existence, or somewhat later, *i. e.* at one or two years of age ?

The experience of all periods is unanimous in this respect. From Rhazes down to us, every medical and even lay man has been aware that small-pox is most destructive among children, especially among the unvaccinated infants at the breast. The relative mortality, as regards newly-born children and infants at the breast, who were treated in the General Hospital of Vienna within the last twenty years was almost 100 per cent., and with unvaccinated children between the fourth and tenth years attacked with small-pox 40·2 per cent. This relative mortality falls, however, much more considerably in the subsequent decennial period of life ; viz., with subjects between the eleventh and the twentieth year, it being only 20·4 per cent. among unvaccinated persons. The two following decennial periods seem to be more dangerous ; for the mortality among unvaccinated individuals suffering from small-pox, is, from the twenty-first to the thirtieth year, 33·6 per cent. ; and from the thirty-first to the fortieth year, 46·2 per cent.

In order to find out the rate of frequency of attacks of small-pox in the several periods of life, and also the amount of protection afforded by vaccination, I shall take the liberty to compute, within the often mentioned last twenty years, the number of persons who, having been vaccinated, were treated and died of small-pox, and compare these numbers with those mentioned above, which have reference to non-vaccinated individuals.

Between the first and tenth year the attacks of small-pox were 418 ; of the 234 who had been vaccinated, 35 died, viz. 14·9 per cent. ; whilst among the unvaccinated 184 patients, no less than 74 died, viz. 40 per cent.

Between the eleventh and twentieth year we had 2,634 small-pox patients, of whom 2,228 had been vaccinated, and 406 not vaccinated. Of the former, 83 died, viz. 3·7 per cent. ; of the latter 83 died, viz. 20·4 per cent.

From the twenty-first to the thirtieth year we treated 2,671 cases of small-pox ; among these, 2,329 persons had been vaccinated, and 342 not vaccinated. Of the former, 128 died, viz. 5·6 per cent. ; of the latter, 115 died, viz. 33·6 per cent.

From the thirty-first to the fortieth year, we had 406 small-pox patients ; of these, 354 had been vaccinated, and 21 died, viz. 5·9 per cent. ; of the unvaccinated, 24 died, viz. 46·2 per cent.

Finally, from the forty-first to the fiftieth year, and above, we had only 84 patients ; 72 had been vaccinated, and 12 not vaccinated. Of the former, there died 5·5 per cent., and of the latter, 33·3 per cent.

It appears, from these figures, that the greatest number of cases of small-pox occurred between the eleventh and thirtieth year. The greatest mortality, however, took place in the first year of life ; afterwards, within the first ten years of life ; and finally, in the period lying between the thirty-first and fortieth years. If we now compare the considerable per-centage of unvaccinated infants at the breast and little children who died of small-pox with the small per-centage of the morbid disturbances following the practice of vaccination, the conclusion will certainly be in favour of the early use of the cow-pox inoculation. To these considerations may be added the fact, that about 1,000 vaccinations are practised annually in the Orphan Asylum of this city upon infants at the breast, many of whom are but a few weeks old, without injury to the health of the children, and without deterioration of the vaccine lymph.

The author is therefore of opinion, that inoculation with the cow-pox matter can be practised upon healthy children in the first weeks of life, not only without any danger, but that it should be had recourse to, in order to protect these children from the infection of small-pox.

NOTE on CAUSES of IMPERFECT VACCINATION.—By MR. MARSON.

THE failures and ill effects in vaccinating are due almost entirely to carelessness. Vaccinators should be chosen for their precise and careful habits in all they do. They should be resolute in not using at any time, for their own convenience or otherwise, lymph for vaccinating that they are in any doubt about. If they doubt of its fitness for use, their doubts will nearly always be found to be well grounded, for doubtful lymph nine times in ten ends in disappointment. Supposing it takes some effect, the patient is badly or indifferently protected, and cannot be effectually vaccinated again, the bad vaccination interfering with the success of a repetition of the operation. More mischief is perhaps done by using lymph for vaccinating taken at too late a stage of the progress of the vesicle than from all other causes put together. The lymph should be taken before the formation of the areola, when the vesicle is fully developed ; the day week from the vaccination is the best time. When lymph can be obtained, as it often can, before the end of the week it is far better, more certain of success, than that taken beyond the week. If by chance there is any delay in the progress of the vesicles, and lymph is wanted from them for vaccinating other persons, the lymph should be taken when the delayed vesicles have reached the stage that vesicles generally do, from good lymph in a fine healthy child, at the week's end. This, all persons practically acquainted with vaccination will readily be able to distinguish.

Lymph taken from vesicles surrounded by areola is apt to produce, if used later than the first day of areola, vesicles that inflame too soon, and run an irregular course, or to produce what has been called abortive vesicles. All these irregularities *ought* to be most carefully guarded against, because persons so vaccinated die perhaps some day from small-pox, for want of that protection which vaccination well performed is capable of affording them.

It is no doubt true that good vesicles have been obtained from using the dry vaccine crust, when it has gone through a stage far beyond the stage of areola; but who, intimately acquainted with vaccination, would think of recommending this plan for general use? What I contend for, and always have contended for, is, that vaccinations should all, so far as possible, be conducted in such a way as has been found to be followed by the most uniform success, and that all, or nearly all, *experimental vaccinations* should be scrupulously avoided, as leaving the persons badly protected, to become some day a prey to small-pox. When such persons have grown up, and in middle life have become the parents of large families, with all a parent's responsibilities, it is a very serious matter for them to be cut off by small-pox, which might have been prevented by a little more care on the part of the vaccinator at the time they were vaccinated. This result I have often witnessed most painfully, in my attendance on the patients at the Small-pox Hospital, and have seen the great poverty and distress it has caused in the helpless families left to lament their irreparable loss.

On the alleged TRANSMISSION of DISEASES by Vaccination.—Remarks by Mr. PAGET, Assistant Surgeon of St. Bartholomew's Hospital, F.R.S.

ALL that we can regard as facts in pathology, or as conclusions fairly deducible from them, are, I believe, opposed to the objections brought against vaccination. The chief of these objections are implied in the second and third questions; but those referred to in the third are, perhaps, the only ones on which pathological evidence can be brought to bear. So far as we yet know, or can reasonably believe, vaccine lymph can be imagined to become " a vehicle of syphilitic, scrofulous, or other constitutional taint," only by being either mixed with, or transformed into, some other virus. For as to whether any other inoculable substance could be substituted for the vaccine, the answer may be, that a properly educated medical practitioner would no more commit such an error than he would substitute oxalic acid for sulphate of magnesia, or corrosive sublimate for calomel, or any other wrong implement of his art in the place of the right one. With regard to the imaginable conveyance of another inoculable substance in mixture with vaccine lymph, I am not aware of any observations on the effects of different kinds of virus purposely mixed; but the suspicion of conveying by such mixture either a syphilitic or a scrofulous infection to the vaccinated child is incredible :—

1. Because, neither infantile syphilis (which alone must be considered here) nor scrofula renders the blood of the patient capable of directly conveying the disease.

2. Because, as scrofula cannot be conveyed in either the unmixed blood, or the unmixed pus of a patient, so it is wholly unreasonable to suppose that it can be conveyed in any product of the blood mingling with the vaccine lymph formed in a scrofulous child.

3. Because, though in some instances infantile syphilis may be conveyed in its own and peculiar morbid products, yet it is very highly improbable that it should be conveyed in the lymph of a well-formed vaccine vehicle; for,

4. If the blood of a scrofulous or syphilitic child could so modify the vaccine disease in it, as that the vaccine lymph should be capable of conveying any other disease, there is every sufficient reason to believe that the vaccine vesicle formed in the diseased child would be modified, in correspondence with the modified lymph.

The study of the mutual relation and influences of specific diseases has shown that some may co-exist in the same person, and retain their several characters unchanged and unmixed. Thus cancer and gout, or cancer and primary or secondary syphilis, may co-exist. In other cases, certain specific diseases so far exclude each other that they do not coincidently make progress or pursue their several ordinary courses. Thus far the several eruptic fevers are mutually exclusive; and so, probably, are cancer and tuberculous disease. But, again, specific diseases may, in a few instances, so influence each other, when they co-exist, that the characters of one are modified by the other. Thus, a secondary or tertiary syphilitic disease may present unusual characters in a scrofulous person, being, we may say, modified by the scrofulous constitutional taint.

Now, in whichever of these relations we may suppose the vaccine disease to stand to other specific diseases, we can find no support for the suspicion that the lymph of a well-formed vaccine vesicle can convey any other disease. In the first relation, the vaccine disease would receive no influence or modification from the co-existent affection; in the second, it would be modified only in respect to its time or rate of progress; and in the third relation, the influence of the co-existent disease or constitutional taint would be indicated by something defective or abnormal in the characters of the vaccine vesicle.

In short, the whole pathology of specific diseases will justify the assertion that a well-formed vaccine vesicle is certain proof of a pure and unmixed vaccine lymph, and that any modification of the lymph, by mixture of another virus, would be indicated by a corresponding modification of the vesicle.

The statement just made implies the answer to suspicions that vaccine lymph may be, though unmixed, yet so transformed as to be a vehicle of an "unintentional infection." All pathological researches accumulate the evidences of the constant correspondence between the material in the blood, on which each specific disease depends, and the morbid structure, by which each is manifested. Thus, the transformations of the syphilitic poison are indicated in the successive external characters of the primary, secondary, and tertiary affections; the transformation of the scarlatina poison by its regular symptoms, and its sequelæ. And so, if the vaccine virus were capable of any transformations besides those which mark its regular influence in each patient, such transformations, we may be sure, would be indicated by corresponding and evident changes in the vaccine vesicle. In other words, if the vaccine were changed into any other virus, there would be no vaccine vesicle.

On these grounds, then, I believe that lymph "from a true Jennerian vesicle," can never be "a vehicle of syphilitic, scrofulous, or other constitutional taint to the vaccinated person."

I have no doubt that the suspicion that vaccination may be mischievous, in any of the ways implied in the questions from the Board of Health, has arisen from a misinterpretation of facts which may be easily explained; and here I venture to write, not merely on deductions from pathology, but on observations made in ten years' practice in the out-patients' room of St. Bartholomew's Hospital, where I believe that a larger number of sick children are seen than in any other institution of the Metropolis, the children's hospital excepted. Among these out-patients, it is not unfrequent to hear children's ailments ascribed to vaccination, and after deducting the cases in which the belief of disease having been a consequence of vaccination is altogether unreasonable, there may remain a certain number in which it may be admitted that disease did follow, and was, in some measure, a consequence of, vaccination. But the only instances in which I can remember that vaccination was with any reason assigned as a cause, have been cases of eczema, or impetigo, or some of the allied cutaneous diseases, or, much more rarely, scrofulous or cachetic abscesses. I do not remember to have ever heard infantile syphilis ascribed to vaccination, frequent as the instances of it are among the out-patients, and the reason probably is, that infantile syphilis usually makes its appearance before the general age for vaccination is attained.

When eczema, impetigo, or any of the other affections I have mentioned above does occur as, in any sense, a consequence of vaccination, the explanation is to be found in the fact, that vaccination produces a certain amount of feverishness, and is followed by a few days' loss of strength, states which, though they are quite insignificant in moderately healthy children, are favourable to the evolution of any constitutional disease or blood-disease to which a sickly child may be liable. In children and adults, alike it is certain that a tendency to the external manifestation of eczema, and the other diseases named above, may exist for many weeks or months, and yet not take effect, till some accident disturbs the health, and weakens, as one may say, the power of retention or repression of the morbid tendency in the blood. There is, indeed, scarcely a blood-disease of which the evolution may not be thus determined or hastened by an accidental injury, or by a casual loss of health. When, therefore, eczema or any such disease so appears after vaccination that the one may, with any reason, be regarded as the consequence of the other, the vaccination may be considered to have done no more than any accidental injury would have done. Indeed, even among ignorant persons, the blame of these diseases is not nearly so often laid on vaccination as it is on accidental blows, falls, frights, colds, surfeits, and other such things. Perhaps the most common expression of all is, that a child "cannot get so much as the scratch of a pin but what brings out the eruption," or "is followed by an abscess."

Now, vaccination may do, though I believe it very rarely does, what these several accidents may do; namely, by disturbing for a time the general health, it may give opportunity for the external manifestation and complete evolution of some constitutional affection, which, but for it, might have remained rather longer latent.

This is, I believe, the worst thing that can, with any show of reason, be charged against vaccination; even this can very seldom be charged with truth; and when it can, it amounts to no more than that a practice, which would confer a nearly universal immunity from a dangerous and horrible disease, may produce, in some of those on whom it confers this benefit, a temporary and not serious illness.

As to vaccination rendering persons "more susceptible of any other infectious disease, or of phthisis," I know no facts that could either prove or disprove such an accusation. I will only observe, that I think such a result of vaccination is improbable, and so entirely without parallel, that the objection founded on the suspicion of it may safely be disregarded, unless it can be supported by many thousands of facts, collected under many varieties of social and external conditions, and carefully analyzed. In such a question as this, single facts, and researches made in small fields of observation, are quite valueless.

NOTES on the PROTECTIVE VALUE of VACCINATION in HOT CLIMATES.—By EDWARD CATOR SEATON, M.D.

IN Dr. Kinnis' report on small-pox, as it appeared in Ceylon (8vo, Colombo, 1835), and in an account of an epidemic of small-pox in the Mauritius read by Mr. Gardner before the Epidemiological Society, and published in the London Journal of Medicine, vol. iv., are various facts illustrative of the protective power of vaccination in hot climates, to which I have referred in my paper "On the Protective and Modifying Powers of Vaccination." I am desirous of adding to these some notes of information which has been communicated to me as Honorary Secretary to the Small-pox and Vaccination Committee of the Epidemiological Society on the same subject from the East and West Indies, and which have not been hitherto published.

I. From the West Indies.

In July 1851, small-pox, which had previously existed for some time in several of the West Indian Islands, broke out in Jamaica, commencing in the county of Trelawney, and extending thence over the whole Island. An inquiry into this epidemic was set on foot by the Central Board of Health of Jamaica, and copies of the replies which were sent to the Board by the medical practitioners of the Island, in answer to their inquiries, were forwarded to me. The following facts and observations are taken from these replies:—

There having been no epidemic of small-pox in Jamaica for twenty years, vaccination had fallen greatly into neglect, as was proved by the numbers who sought its protecting influence as soon as the present epidemic broke out. One practitioner, Dr. Bowerbank, of Spanish Town, vaccinated in the early part of 1852, 2,450 persons; another, Dr. Brooks, who four years before had made vain attempts to induce people to be vaccinated, operated, in five weeks of 1851, upon upwards of 1500 people; Dr. Clarke, who in sixteen years residence had not vaccinated above 200 persons, vaccinated after the outbreak of the epidemic more than 3000; and Dr. Jelly, who had vaccinated nobody at all for twenty-two years, in six weeks operated on 2000. Dr. Adolphus, who in five years' residence at Savanna-la-Mar, had held two formal vaccinations, at which by great persuasion he only got about 200 people to attend, now in a short period vaccinated above 1500. The testimony of other medical men is to the same effect, and proves that in Jamaica, as in other countries, in the absence of a constraining law, or of the fear of an immediate attack of the disease, the people habitually neglect the protection to which they however readily resort when danger is at hand, though often not until it is too late.

The testimony borne to the protective value of vaccination by the medical practitioners of Jamaica is unanimous and conclusive. Not one of them saw a single case of small-pox in a person vaccinated by himself. In many of the cases in which small-pox is said to have occurred in persons vaccinated, an inquiry proved that they had not been effectually vaccinated. Dr. Clarke, of Annotto Bay, gives some illustrations of this. "Of 265 persons," he says, "named in my list as subjected to vaccination in this town, where small-pox has "been prevalent for the last four or five months, one only, Elizabeth Francis, has taken the disease, and she is "happily a living witness to declare that no vesicle followed the operation in her case. It would be tedious to "detail the several instances in which vaccination has been stated (and with an extraordinary amount of circum-"stantiality) to have failed as a protection against small-pox. Suffice it to say, that each and all have in "succession broken down, every case having proved on investigation to be either one of some other eruptive "disorder, or one in which the vaccine vesicle had never developed itself, or one in which the vaccine puncture "had never been made." An example is given of an estate on which, of 113 persons vaccinated, four were stated to have had small-pox subsequently. "In three out of the four," says Dr. Clarke, "I possess "unequivocal proof that the vaccine vesicle never developed itself, and the fourth I have not yet been able to "find out." Again, of 89 on another estate, three were stated to have had small-pox subsequent to vaccination. In two there was clear proof that no vaccine vesicle had ever developed itself, the third person could not be found. "Results," he adds, "might be given exemplifying the all but complete immunity of whole localities, "where the vaccine operation has been more fully carried out, e. g. Belfield Pen, Agualta Vale Estate, &c., but "the protection which vaccination furnishes is best illustrated in districts, such as those first named, where its "use has been more partial, and where, in consequence, the subjects of vaccination and the victims of small-pox "have been in habits of intercourse; and here the result is, that, setting aside six cases of vaccine puncture "in which it is already ascertained that no vesicle followed, and two others into which circumstances at the "present prevent inquiry, we have, out of 459 persons subjected to the vaccine puncture, and *residing in* "*localities which have been the seat of epidemic small-pox for months past*, not one instance of that disease." Another practitioner, Dr. Raphey, in a report to the local board of St. George's, mentions his having vaccinated 37 children at the parochial school at Buff Bay. The school being subsequently closed, the children were sent home to their relations in the neighbourhood where the disease was very malignant and fatal, but all these 37 children are living, and were protected by their vaccination.

The testimony to the modifying power of vaccination is equally unanimous and striking; and two practitioners, Dr. Bowerbank and Dr. Turner, have given a statistical statement of the cases attended by them, which shews the following results:—

	Cases.	Deaths.
Unprotected - - - - - - - -	477	75
Protected by previous small-pox - - - - - -	11	2
Protected by vaccination - - - - - - -	120	4

Of the cases reported to be protected by vaccination, it is stated that there was in many no proof that the vaccination had ever been effective. Other practitioners report that they did not see a death from small-pox in a vaccinated person. Both the protective and modifying power was observed in the negro and half-cast as well as in the white residents.

II. From the East Indies.

The information obtained from the East Indies was in answer to inquiries addressed to medical practitioners employed there, through the medical boards of the respective Presidencies. The most complete returns have been from the Presidency of Bombay, in which more attention is bestowed on the diffusion of vaccination than in either of the other Presidencies. They show the state of vaccination, even in that Presidency, to be lamentably defective, and to this is due the high rate of mortality from small-pox which on the whole prevails, for without any exception they attest the protective value of vaccination whenever it is employed. Mr. Johnstone, the acting superintendent of vaccination for the Concan division, says, " On two " occasions, in towns close to one another, I observed the disease (small-pox) from its commencement to its " termination. In the first instance it occurred in the large town of Callian, situation low and heat great; " here the disease was characterized by great severity. Many deaths occurred, and hopeless cases of dis- " organization of the joints and eyes. In this place, as many as would receive vaccination were operated upon, " and from strict inquiry I found that those people who were previously successfully vaccinated did not " sustain the disease on this or on previous visitations of small-pox. In the second instance, at a town a few " miles to the north-east of the above, the small-pox broke out a short time afterwards. Here the position " was open, and exposed to the sea breezes, and the disease was of a peculiarly mild form. No person pre- " viously vaccinated suffered." Dr. Mahaffy, superintending vaccinator of the north-west division of Guzerat, took indiscriminately from his records ten villages, which (along with others situated at a distance of from one to five miles from the city of Ahmedabad) had been carefully vaccinated in the hot weather and rains of 1850, and caused inquiries to be made whether any deaths from small-pox had taken place during the months of February, March, and April 1851, when small-pox prevailed in the city and camp of Ahmedabad. The replies received from the village police, revenue officers, and village accountants all concur in stating, that since the time vaccination was carried out, no deaths from small-pox had taken place, and if the disease prevailed at all it must have been to a trifling extent, as they had not heard of it in their villages. Mr. Broughton, civil surgeon at Kohlapoor, gives instances still more striking, small-pox cases having been introduced into the lines of regiments under his charge, in which he had kept all well vaccinated, and although very many were exposed, they all escaped. The testimony of Mr. Don has been already quoted in the Report of the Epidemiological Society, 1853. But the fullest information of all is that furnished by Mr. Stuart, who for nearly four years had the superintendence of vaccinations in the Deccan division, vaccinating by himself and assistants on an average 12,000 per annum. " Before the introduction of vaccination," he says, " into that " part of India to which I have alluded, variola was almost constantly present in some portion or another of " the country, attacking children and adults with a virulence we rarely see in England, causing a fearful " fatality, and ever leaving behind victims to its disfiguring effects, more especially by the loss of sight. " Now since vaccination has become general, and a sufficient period has elapsed to test its utility, we find it " in the fact that small-pox occurs at distant intervals in limited localities, is of a very much milder form, " appears only at certain periods of the year, is sometimes unheard of in the whole division for one or more " years,—the fatality is on a comparatively infinitesimal scale,—that while all the old people even now show " by their scarred faces how few escaped from its effects, the smooth healthy faces of the young and middle " aged prove that some influence has been at work to arrest the progress of the cause of such a marring of " the human countenance." Mr. Stuart remarks that he examined hundreds of the victims of small-pox, but on none could he find a distinct vaccine scar; and on the other hand, that he had seen hundreds of those vaccinated in previous years of whom none had taken small-pox. He then proceeds to give the following proof of the practical benefits arising from vaccination carried out with vigour:—

" The inhabitants of Chandore and Jooneer, two large native towns numbering several thousand residents, had, even up to the period I was appointed vaccinator, been much opposed to vaccination, notwithstanding repeated efforts to introduce it among them; at last, variola of a virulent character appearing, petitions were forwarded me to send them a vaccinator. Each member of my establishment thus sent reported to me that in the majority of cases the variolous eruption was of the discrete type, but where the people were very densely crowded together it was of the confluent form; that there had been many fatal cases; that there were then above two hundred cases in each town; and that it was spreading. The vaccination was speedily established, and increased numbers brought under its effects weekly. After the lapse of three weeks I was informed that the new cases of small-pox were diminishing in number, which continued to be the case till the disease disappeared altogether—vaccinia, as it were, advancing as small-pox receded from the scene. They reported to me that during the first three weeks a great proportion of those whom they vaccinated not only did not exhibit any effect from the operation, but the variolous eruption appeared at short intervals after it, and, where the variolous eruption appeared first, vaccinia seemed totally to fail. This might be expected, as they vaccinated indiscriminately all who had not the variolous eruption upon their bodies. In other instances the two diseases seemed to be introduced into the system at the same time, both eruptions appearing distinctly marked: In these cases they reported that the variola was much modified, especially when the vaccinia appeared early, and not one died; *and in all in whom the vaccinia appeared singly the children remained perfectly free from variola. although living among relatives suffering from that disease.* Thus here are two instances of densely populated localities where, variola of a virulent form raging at the time and spreading daily, vaccinia, being introduced even into the same households, arrests its progress, renders those in whom it succeeds in establishing itself perfectly secure, and in a short time drives the enemy from the field. On my visiting Chandore while what I have related was going on, I became an eye-witness to the facts I have related. Moreover, I was very particular in inquiring *whether any parties were living in the town who had been vaccinated previously. I found a few, of different ages, some adults; but in not a single instance had they become affected with variola.* The inhabitants there appeared quite aware of the protective power of vaccinia."

Mr. Stuart gives the following further illustration:—

"Another decided proof of the protective power of vaccinia is exhibited in the fact, that our native regiments seldom, if ever, exhibit on their Hospital Records the existence of variola, arising from the rule, that all recruits on joining the regiment are examined, and if they have not been vaccinated before, or have not suffered from variola, are immediately vaccinated; as their wives and families generally live with them in their quarters, which are small huts with no means of ventilation but the door, and accompany them on the march, and as there is no rule to compel them to be vaccinated except the negative one, that if any of them become attacked with variola they are immediately sent away, variola often appears in their families, and they come in immediate contact with it; yet I never knew one in whom it was certain, from the well-defined character of the vaccine scar, that he had been successfully vaccinated, become affected with the disease; no, nor their wives or children either, if they had been vaccinated. I have vaccinated numerous adult sepoys, and I ever found the vaccinia appear as healthily as in a child.".

Mr. Stuart contrasts with the foregoing the condition of some portion of the Presidency in which the natives are opposed to vaccination, where variola is constantly spreading, and where the numbers of the blind and the disfigured from its effects are very great; and he mentions instances of villages in India remaining unaffected by small-pox, the inhabitants being protected by vaccination, when the disease had been so severely epidemic in the surrounding villages that few or none had escaped an attack. He exercised the most scrupulous vigilance in the inspection of the course of the vaccination in all submitted to its influence. " It was a standing rule with us," he says, " in all cases where there was the least doubt, arising from the " vesicles not presenting the true healthy character, from their heads having been scratched off, or even if on " visiting the localities at some interval of time any children were found without a distinct scar, to perform " re-vaccination.'

In Dr. Morehead's valuable "Researches on Disease in India" he mentions that the mortality from the small-pox in the general population of the Island of Bombay, who are very imperfectly vaccinated, is very nearly sixty out of every thousand deaths from all causes, or as great as in some of the worst parts of Ireland; but among the European residents, the great majority of whom are protected by vaccination, the ratio of mortality is only a fraction more than ten out of a thousand deaths from all causes, or less than that which takes place in England.—See vol. i., p. 320.

NOTES by DR. SEATON on the PRESENT SMALL-POX MORTALITY of SCOTLAND and IRELAND.

I. SCOTLAND.

THE total (ascertained) population of Scotland in 1851 was 2,888,742; and the (estimated) population in 1856, 3,033,176.

The causes of death are only analysed as regards eight principal towns, the population of which in 1851 was as follows:—

Glasgow	329,096
Edinburgh	161,648
Dundee	80,027
Aberdeen	73,227
Paisley	48,071
Greenock	37,436
Leith	32,219
Perth	25,441
Total ascertained in 1851	787,166
Estimated for 1856	854,066

In these eight towns the total mortality from small-pox in 1856 was 645, and of epidemic diseases this was fifth in the order of prevalence:—Scarlatina, 1,371; hooping cough, 1,348; typhus, 801; diarrhœa, 779; small-pox, 645; measles, 501; croup, 393; dysentery, 168. The total mortality from all causes being 22,248, the deaths from small-pox constituted 2·8 per cent., which is double the average of London for the last ten years, or of England and Wales for the last seven, and fourteen fold the average of Bohemia or Lombardy.

The mortality occurred very differently in the different towns. In Perth and Greenock there was scarcely any, the deaths being respectively four and seven,—and even in Glasgow, where they amounted to 129, they constituted but 1¼ per cent. of the total mortality,—but in Edinburgh and Leith they were 3·2; in Aberdeen, 3·91; in Paisley, 4·64; and in Dundee amounted to 9·33 per cent. (vide Table). Thus in this latter town it caused one tenth of the mortality of the whole year. Even this gives but a feeble notion of the intensity of the mortality from this disease at its period of greatest prevalence. Commencing in the October of the preceding year, when the deaths amounted to 19, the epidemic extended in November causing 25 deaths, and during December 51. The maximum mortality was attained in January 1856, when the deaths were 95, from which number they fell to 70 in February, to 35 in March, to 10 in April, and to 7 in May. Out of the whole 229 deaths, therefore, 217 occurred in these five months. The Registrar General for Scotland, speaking of the mortality which occurred from small-pox in Dundee in January, observes—"The deaths from this single disease constituted not less than 30 per cent. of the total mortality, *a mortality which has been exceeded by no single disease during the last ten years*, with the exception of the epidemic typhus in the month of November 1847, when the deaths therefrom numbered 108, and the fatal cholera epidemic of 1849, when the deaths from that disease during the months of July, August, and September numbered respectively 209, 420, and 159." But taking the mortality of this town from small-pox for the entire year, it was proportionally more than three times greater than the highest mortality which has taken place in London for the last ten years; viz., that in 1848, when the deaths amounted to 1,617, which is above double the average annual mortality of the metropolis; but had the deaths taken place in the same proportion to population as in Dundee las tyear, they would have amounted to upwards of 5,000.

The cause of this high mortality is the neglect of vaccination. The large proportion of deaths (from 80 to 85 per cent.) which takes place under the age of five, when the protection from death afforded by efficient vaccination may be looked upon as absolute, is sufficient proof of this; but the fact is also shown by the inquiries of the Registrar General and District Registrars. The Registrar of the second district of Dundee observes—"Since this disease broke out last year I have been carefully observing the various cases (deaths) registered; and from these observations and the information I have acquired by conversing with the parents and medical men of the district, I am under the conviction that if the vaccination of their children was rendered imperative on all parents, the severity of the disease would be greatly mitigated, and many precious lives would be saved. In confirmation I may state, that out of the last 30 cases (deaths) I have registered, there has not been one child that was properly vaccinated, and that there are several families who have lost one or more of their children *who had not been vaccinated*, while their other children who were ill at the same time, *but who had been vaccinated*, recovered. These are common cases, and I think plainly point out the necessity there is for legislative measures being taken to enforce the fulfilment of the duty of vaccination on all parents." The Registrar General in his last quarterly return, referring to the state of Scotland generally, says that small-pox has been very general, and adds—"It will be seen from the Registrar's notes, a few of which are appended, that the deaths from that loathsome disease have been almost everywhere confined to those who had not been vaccinated; and these notes are all the more valuable, as coming from men who may be presumed to have no medical theory to support, and who are recording facts whose truth they have personally ascertained." Thus the Registrar of Glammis, in Forfar, says—"Of upwards of 30 cases of small-pox three only proved fatal; and from inquiries made, I find that in almost all the other cases pre-vaccination had taken place. . . . None of the three had been vaccinated." The Registrar of Bonhill in Dumbarton, writes—"Since the Registration Act came into operation, in every case of small-pox that proved fatal, the party invariably had not been vaccinated." The Registrar of Hawick states—"That small-pox was very fatal during the quarter, and all the deaths have occurred in the case of persons not vaccinated." The Registrar of Kirkmichael, in Ayr, says—"In the village of Kirkmichael, with a population of about 600, there have been upwards of 100 cases of small-pox; and it is worthy of remark, that no child under five years of age who had been vaccinated was affected."

Bearing in mind that in no country in Europe, which furnished returns to the Epidemiological Society, is the average mortality from small-pox so high as in London, or in England and Wales generally, in either of which it constitutes about 1½ per cent. of the mortality from all causes;—bearing in mind that the proportional mortality in London has never, during the last ten years, attained 3 per cent.; we read with amazement and regret that in Aberdeen, in July 1856, small-pox caused 10 per cent.; in Edinburgh, 5½ per cent.; and in Paisley, 5 per cent. of the total mortality; and that Paisley and Leith should now be going through epidemics similar to that which at the commencement of last year was so fatal in Dundee. The deaths in Paisley, in October, constituted 7 per cent.; in December, 11 per cent.; in January 1857, 8·9 per cent.; and in February, upwards of 13 per cent. of the total mortality; while in Leith the deaths were 6·6 per cent. in November, 16 per cent. in December, 15 per cent. in January, and in February no fewer than 28·3.

MORTALITY from Small-pox in Eight Principal Towns in Scotland, 1856.

—	GLASGOW.		EDINBURGH.		DUNDEE.		ABERDEEN.		PAISLEY.		GREENOCK.		LEITH.		PERTH.	
	Under 5 Years.	Total.	Under 5 Years.	Total.	Under 5 Years.	Total.	Under 5 Years.	Total.	Under 5 Years.	Total.	Under 5 Years.	Total.	Under 5 Years.	Total.	Under 5 Years.	Total.
January - -	7	11	1	3	80	95	3	3	—	—	—	—	—	—	—	—
February - -	7	10	4	4	62	70	1	1	—	—	1	1	—	—	—	1
March - -	10	11	3	3	29	35	1	3	—	—	—	—	—	—	—	—
April - -	13	14	4	7	8	10	—	—	3	3	—	—	—	—	1	1
May - - -	1	17	7	7	6	7	7	10	2	2	1	1	—	—	—	—
June - -		6	10	11	2	4	7	8	3	4	1	1	—	—	—	—
July - -	55	9	19	20	2	2	10	15	4	4	1	1	1	1	—	1
August - -	8	8	17	19	—	—	8	12	5	6	—	—	4	4	—	—
September - -	7	8	14	15	2	2	1	7	7	8	—	—	2	3	—	—
October - -	11	11	7	9	1	1	—	4	5	6	—	—	2	3	1	1
November - -	7	9	19	24	2	2	1	1	2	2	2	2	3	4	—	—
December - -	12	15	9	11	1	1	—	1	12	16	1	1	9	12	—	—
Total Deaths from Small-pox - -	110	129	114	133	195	229	39	65	43	51	7	7	21	27	2	4
Deaths from all Causes - -	5,433	10,280	1,739	4,136	1,354	2,453	590	1,659	514	1,098	579	1,237	393	826	179	559
Deaths per Cent. from Small-pox to Deaths from all Causes - -	—	1·25	—	3·21	—	9·33	—	3·91	—	4·64	—	—	—	3·2	—	—

II. IRELAND.

1. From the mode of taking the mortality in the Irish census the deaths recorded must be *less* than the number which actually occurred, because there is no record of those which took place in families who, in the course of the ten years, had emigrated or died out, or who had ceased to be independent occupiers. In consequence of the famine, fever, and emigration in 1841—1851, this would apply more especially to this than to the preceding decade, and would account for an apparent diminution in the number of deaths, when there is no reason to believe much if any actual diminution.

2. From the well-known character of the disease it may safely be inferred that though the census may not include all who died of the affection, yet the deaths specified from small-pox do not include those from other diseases.

3. The following is the order of fatality of the different chief epidemic diseases in the two censuses respectively:—

Census of 1841.	Census of 1851.
1. Fever.	1. Fever.
2. Small-pox.	2. Diarrhœa and Dysentery.
3. Croup.	3. Small-pox.
4. Cholera.	4. Cholera.
5. Hooping-cough.	5. Measles.
6. Measles.	6. Hooping-cough.
7. Diarrhœa and Dysentery.	7. Croup.
8. Influenza.	8. Scarlatina.
9. Scarlatina	9. Influenza.

The increase in diarrhœa and dysentery in the last ten years being the result of the famine, small-pox may be said to retain its bad pre-eminenee.

4. In the preceding century small-pox disputed the pre-eminence with fever itself. That it does so no longer is due to the practice of vaccination, so far as it is observed. That its mortality is not below that of measles, hooping-cough, or scarlatina, as in England, is due to the limited extent to which this conservative measure is adopted.

5. It is remarkable that in proportion to the general mortality small-pox has proved most fatal in the country parts, while fever has principally raged in towns and cities, although the same influences tended equally to the propagation of both diseases. This fact still further proves the great importance of an extensive and general adoption of vaccination in this country, for it is chiefly in the rural districts where the natural pock is still maintained. (Wilde, Census of 1841, p. xii.)

6. Of the 58,006 deaths from small-pox recorded in the census of 1841, no fewer than 51,034 occurred under the age of 10; and of the 38,275 recorded in the census of 1851, 34,377 were equally under 10 years of age. The *whole* of these 85,411 deaths (constituting nearly nine tenths of the total mortality) may (almost without exception) be attributed to neglect of vaccination; and of the remainder, without doubt, by far the larger portion.

7. On census day (March 30, 1851) 888 persons were reported as labouring under small-pox, of whom 516 were in workhouses or workhouse hospitals. Mr. Wilde suggests that vaccination should be enforced upon all unprotected who seek admission into workhouses.

IRELAND—CENSUS OF 1841.

SMALL-POX.	Leinster.	Munster.	Ulster.	Connaught.	All Ireland.
Under 12 months -	4,165	7,769	6,493	5,761	24,188
1 to 3 - -	4,751	8,052	6,029	6,018	24,850
5 and under 10 -	1,200	1,861	1,617	1,326	6,004
10 and under 15 -	293	384	448	269	1,394
15 and under 20 -	184	218	301	111	814
20 and under 25 -	103	114	180	37	434
25 and under 30 -	33	39	62	10	144
30 to 60 - -	26	40	42	20	128
Above 60 - -	1	10	1	1	13
Ages unspecified -	6	18	11	2	37
Total for small-pox -	10,762	18,505	15,184	13,555	58,006
Measles - -	6,631	10,673	7,302	6,133	30,739
Scarlatina - -	5,181	1,563	904	238	7,886
Hooping-cough -	7,830	10,880	9,622	7,966	36,298
Croup - -	11,096	15,540	3,973	12,094	42,705
Dysentery and Diarrhœa - -	1,832	4,864	1,891	2,157	10,744
Cholera - -	17,115	21,680	5,664	6,310	50,769
Influenza - -	3,988	3,659	1,418	1,510	10,575
Fever - -	29,815	34,061	27,238	20,958	112,072
Total epidemics -	95,876	122,318	90,498	72,557	381,249
Total specified -	303,556	344,879	270,381	188,838	1,107,654
Total specified and unspecified -	323,095	363,907	294,550	205,222	1,187,374

IRELAND—CENSUS OF 1851.

SMALL-POX.	Leinster, p. 334.	Munster, p. 456.	Ulster, p. 578	Connaught, p. 650.	All Ireland, p. 664.
Under 12 months -	1,383	2,559	1,440	1,483	6,865
1 to 5 - -	3,594	8,054	3,725	4,479	19,852
5 and under 10 -	1,517	3,235	1,384	1,524	7,660
10 and under 15 -	483	859	372	383	2,097
15 and under 20 -	294	259	171	121	845
20 and under 25 -	187	113	104	44	448
25 and under 30 -	93	35	39	9	176
30 to 60 - -	85	83	52	16	236
Above 60 - -	9	21	6	5	41
Ages unspecified -	22	23	3	7	55
Total for small-pox -	7,667	15,241	7,296	8,071	38,275
Measles - -	6,297	11,122	6,753	5,123	29,295
Scarlatina - -	8,944	6,608	3,864	756	20,171
Hooping-cough -	6,743	8,082	7,509	4,539	26,873
Croup - -	8,124	8,165	2,864	4,649	23,802
Dysentery - -	11,306	43,930	12,384	25,612	93,232
Diarrhœa - -	8,193	16,404	9,321	7,405	41,323
Cholera - -	10,809	15,377	3,236	6,567	35,989
Influenza - -	4,835	2,755	2,256	907	10,753
Fever - - -	47,405	87,741	41,818	45,065	222,029
Total epidemics -	122,072	216,499	105,903	109,327	553,801
Total specified -	333,833	408,052	279,066	204,319	1,225,270
Total specified and unspecified -	355,810	470,842	310,640	224,259	1,361,051

SMALL-POX DEATHS (IRELAND) 1831–41.

——	The Seasons were not analyzed for this Decade.
Civic Districts - - -	12,418
Rural Districts - - - -	45,459
Hospitals and Sanitary Institutions -	129
Total - - - -	58,006

SMALL-POX DEATHS (IRELAND) 1841–51.

——	Spring.	Summer.	Autumn.	Winter.	Whole Year.
Civic Districts -	2,102	2,806	1,094	2,494	8,496
Rural Districts -	7,062	6,647	3,663	6,758	24,130
Hospitals - -	190	166	114	163	633
Workhouses -	1,830	1,113	641	1,432	5,016
Total - -	11,184	10,732	5,512	10,847	38,275

POPULATION OF THE CIVIC AND RURAL DISTRICTS (1841).			POPULATION OF THE CIVIC AND RURAL DISTRICTS (1851).		
—	Civic Districts.—Towns of 2,000 Inhabitants and upwards.	Rural Districts.—Country Parts and small Towns and Villages, the Population of which does not amount to 2,000.	—	Civic Districts.—Towns of 2,000 Inhabitants and upwards exclusive of Workhouses.	Rural Districts.—Country Parts and small Towns and Villages, the Population of which, exclusive of Workhouses, does not amount to 2,000.
Leinster - -	442,625	1,531,106	Leinster - -	479,984	1,192,754
Munster - -	386,941	2,009,220	Munster - -	391,637	1,466,099
Ulster - -	225,675	2,160,698	Ulster - -	262,173	1,749,707
Connaught - -	80,224	1,338,635	Connaught - -	83,762	926,269
All Ireland - -	1,135,465	7,039,659	All Ireland - -	1,217,556	5,334,829

REMARKS on certain alleged EFFECTS of VACCINATION.—By Dr. WEST, Physician of the Hospital for Sick Children.

MY opportunities for observing the immediate results of vaccination are, of course, much smaller than those of persons engaged in the practice of vaccinating. I have, however, during the past seventeen years, had more than 26,000 infants and children under my care, either at the Dispensary for Children, in Lambeth, or at the Hospital for Sick Children, in Ormond Street, and have, during this time, seen nothing to make me believe that vaccination is a frequent cause of cutaneous eruptions, or that it excites them in any but very exceptional cases. Now and then, in cases where much feverishness attends the vaccination, patches of a diffused redness (*roseola*, or rose-rash) appear in different parts of the body. This disappears, however, with the subsidence of the fever, and a rash of the same kind, and equally marked, is far from unusual in children during teething.

That popular eruption known as "red gum" by nurses, the *strophulus* of medical writers, is likewise sometimes induced by vaccination, but it is an occurrence so common in early childhood, from irritation of any kind, that it is seldom that other than nursery remedies are employed for it. I have seen it, too, very marked when vaccination has not yet been performed. Considerable inflammation now and then attacks the arm around the puncture. This inflammation sometimes assumes the characters of infantile erysipelas. I once saw gangrene of the skin and death after vaccination, and a few such cases are on record. In the Foundling Hospitals on the continent, where infantile erysipelas occurs not very unusually, as a result of the various unfavourable influences to which the infants are exposed, vaccination seems sometimes to be an exciting cause of its occurrence; and such erysipelas does prove fatal without giving rise to gangrene. Even then, however, it is only a very small minority of cases that are in the least connected with vaccination.

There has never come under my notice any instance in which there seemed the slightest pretext for supposing that syphilis had been communicated to infants through the medium of the vaccine lymph. There are some alleged cases which were said to have occurred at Cremona, and are reported by Dr. A. H. Tassani, in the "Gazetta Medica di Milano, Ottobre 14, 1843." There is no evidence, however, even of the first essential point in the case, viz., of the syphilitic affection of the child from whom the others were vaccinated; but rather the reverse, since it died some months after, never having had a syphilitic symptom.

By far the greater number of the skin affections of infancy are *eczema*, in some form or other. In some families all the children suffer from it, more or less, till after teething is over; and in them it is apt also to become chronic. Now, just as the irritation of teething may bring on or may aggravate an outbreak of *eczema*, so I believe vaccination may, though I do not think it does so very frequently. In some of the worst cases of *eczema* which I have seen, vaccination had been postponed on account of the rash. My advice in the case of children who had already shewn symptoms of *eczema*, or in whose family the affection prevails, is to vaccinate *early*, in order to avoid the irritation which attends and even precedes teething, and the existence of which of course greatly increases the chances of vaccination having troublesome consequences.

With reference to the alleged increased prevalence of measles since the introduction of vaccination, it suffices to say that vaccination preserves only from small-pox, not from any other disease. Measles is, next to the small-pox, the most contagious of all fevers. The child who, sixty years ago, would have died of small-pox, is now preserved from that, often only to catch, perhaps to die, of measles. An increased number of deaths from the latter disease was the unavoidable consequence of the comparative extinction of the former. The fact is obvious, and is noticed by the late Dr. Watt of Glasgow, though for the moment lost sight of by some philanthropists, and by mathematicians like Duvillard in his essay, "De l'Influence de la Petite Vérole sur la Mortalité."

EXPERIENCE of the MEDICAL OFFICERS of certain SCHOOLS in which VACCINATION is general.

1. In CHRIST'S HOSPITAL, HERTFORD;—by R. D. J. EVANS, M.D.

THE time I have been Medical Officer of Christ's Hospital, Hertford, is 16 years; and my observations extend over the whole of that period.

The average number of boys in the Hospital at Hertford has been 436, of whom 152 were between 10 and 12 years of age, and 284 between 7 and 10. The average number of girls has been 69; and as they remain in the Hospital until 15 years of age, there is a slight difference in the proportion of their ages.

The number of deaths in the 16 years has been 61 (of whom 5 were girls) from causes as under.

Scarlet fever - -	9 (But not one since August 1844).		
Measles - - -	9	Disease of the heart	1
Low fever - -	22	General debility - - -	2
Whooping cough - -	3	Rheumatic affection -	1
Inflammation of the bowels	5	Paralysis - -	1
Inflammation of the lungs	1	St. Vitus's dance - - -	1
Disease of brain - -	4	During absence; cause not known	2

The boys are draughted four times a year to London, about 50 each time, and new boys are admitted every month to replace those advanced to the London School: so that the average time boys are kept at Hertford is about 2½ years. All boys received are examined by the Medical Officer; and so are all those sent to London.

The average of boys in the infirmary is 22, and of boys absent with their friends on account of their health 13; but there are in general convalescent children who return after an absence of five or six weeks.

The average of girls in the Infirmary is 3, and of absentees 1.

As it is a positive rule that no child shall be kept at the well wards with sickness or ailment of any description, many of those taken into the Infirmary are for trivial causes, and are seldom retained there more than a week or ten days; and many are sent to attend the schools from the Infirmary.

2. In MARLBOROUGH COLLEGE, WILTS;—by WALTER FERGUS, M.D.

OF 1,346 pupils of whom I have been able to obtain the particulars, all had been vaccinated excepting two. One of these boys, born in 1833, had been inoculated with small-pox; and the other was the son of a gentleman who, having doubt about the efficacy of vaccination, had the operation performed on every alternate child, leaving one half of his children un-vaccinated. He made no remonstrance when he heard that I had supplied his omission in the case of his son.

5·72 per cent. of the total number had been vaccinated twice or oftener. In two or three instances the operation was said to have been done frequently.

3·26 per cent. had small-pox after vaccination; 1 had small-pox in infancy, without vaccination; 2 had been inoculated with small-pox after vaccination without any effect.

The general health of the pupils of this College has been remarkably good, especially since the drainage has been completed and due attention paid to sanitary precautions.

The average yearly number of pupils resident in the College during the 8 years that I have been Medical Officer, has been 414; these, with about 60 adult persons, constitute the community under my charge. The number of pupils out of school each day on account of sickness, including illnesses and injuries of sometimes extremely trivial character, has varied from 2·75 to 5·05 per cent., the higher number being caused by the presence of epidemics, such as scarlatina, or measles, which necessitate the prolonged stay in the sick-house of each patient affected by them. During non-epidemic years the average number is 3·07 per cent. and in epidemic years 4·32 per cent., making a general average of almost 3·7 per cent. daily out of school during the 8 years. Owing to the imperfection of the records I have found it impossible to extend my inquiries beyond that time.

During this period of 8 years there have been 4 deaths among the pupils, and one death among the adults. The cause of death in two cases was pneumonia. One boy had inflammation of both lungs, to which was added an attack of mild scarlatina. The other death from pneumonia occurred during convalescence from a rather severe attack of scarlatina, in a boy who had a year previously nearly lost his life by pneumonia. The third death was caused by a malignant pustule on the face terminating fatally, in 4 days, by effusion on the brain: this was in a boy who had very recently entered the college. The fourth death was the result of irritation of the brain accompanied in the end by pneumonia.

The death in the adult was caused by irritation of the kidney, accompanied by albuminuria and incipient phthisis; 3 brothers who had lived in Devonshire had died nearly at the same age (35) of similar affection.

The diseases which have been epidemic in the College are scarlatina, measles, and mumps.

In 1,849, one solitary case of scarlatina occurred, and the disease spread no further.

In 1852, from February to June, there were 46 cases of scarlatina, all of which terminated favourably, excepting the 2 who died of pneumonia mentioned above.

In April and May, 1853, scarlatina returned to a small extent. There were 11 cases, all terminating favourably.

In 1855, from March to June, there were 63 cases of scarlatina, all of which recovered. Since then there has been no return of the disease. In 1855 the cases were generally of a more severe character than they were in 1852; but there was less tendency to affection of the kidneys in 1855, and the recoveries were in general more rapid and more satisfactory than they had been in 1853. Belladonna was given in both of the great epidemics; but it seemed to have not the slightest effect either in checking the disease or in modifying its course.

Measles has only once visited the College during the 8 years. In August and September, 1855, it swept through the school so rapidly, that in little more than 3 weeks there were 97 cases; some of them alarming from the presence of laryngitis. But they all recovered satisfactorily. Typhus has never occurred. One boy brought it with him from an infected locality; but in the College it was limited to himself, and he recovered after a long and dangerous illness.

The age of the pupils varies on admission from 8 to 16 years: the large majority being between the ages of 10 and 14: the pupils remain till they are 18 or 19, at which ages there are few left.

The principal diseases in non-epidemic years are such as might be expected in such a population, and consist chiefly of disorders of the respiratory and digestive apparatus, which in many instances by receiving prompt attention, are prevented from assuming a more grave character.

In the College we have frequently as it were resisted the incursion of diseases which have been epidemic around us. Small-pox, scarlatina, and measles, have all been prevalent in severe and fatal forms, while the College has remained intact. I have only known one case in which a boy was removed, on account of the climate disagreeing with him: he was a native of a marshy district, and was unable to bear the bracing air of this place.

3. In the WELCH CHARITY SCHOOL, GRAY'S INN ROAD;—by WALTER GRIFFITH, Esq., F.R.C.S.

AFTER a medical experience of more than 40 years, my confidence in the protection against small-pox which vaccination affords is increased rather than diminished. During that period, I have not seen a case in which the vaccine lymph has been a vehicle of any other constitutional infection. My experience is based, not merely upon private practice, but upon the number of children in the Welsh School, to which establishment I have been the medical attendant for 27 years. To that Institution I admit no child that does not exhibit the evidence of vaccination having been properly performed, or of having had small-pox. In the year 1849, a case of small-pox occurring, the whole of the children were re-vaccinated, and nearly all came under the vaccine influence in a modified form. In eleven cases, the pustular eruption was more marked, having the character of genuine cow-pox. During the last 8 years (a fair specimen of the preceding 20) eleven deaths have occurred from the following causes; 5 from consumption, 2 heart disease, 2 brain disease, 1 hooping cough, 1 accident (fractured skull). The number of children, 200: average age, between 11 and 12.

[*Additional particulars by Dr. Griffith, Assistant Physician-Accoucheur to St. Thomas's Hospital.*—The school was instituted for the children of Welsh parents, born within 10 miles of the Royal Exchange. When full, the school contains 200 children—130 boys and 70 girls; but the number varies somewhat, owing to removals. The usual length of stay is from 8 to 14. None are admitted after 10 years of age. The average age is 11½. Before admission, the children are carefully examined, both as to general health and as to previous existence of small-pox or vaccination. If crippled, or out of health, which rarely happens, they are rejected. If there be no sufficient mark of vaccination or small-pox, then admission is postponed until the former has been successfully practised. I believe that during the last 25 years no case of insusceptibility to the vaccine virus has occurred.

On June 19th, 1849, and following days, *all* the children were *re*-vaccinated. This was considered adviseable, in consequence of one of the girls having been attacked with small-pox, in a modified form. It had, apparently, been contracted about 10 days before its discovery, while the girl, being at home for a few hours on the usual holiday, had associated with children suffering from the complaint. She was of course at once removed from the school; and no other case has since occurred. She quickly recovered; and, I am informed, shows no pits or other trace of disease.

The subjoined tables shew the number of previous cicatrices, and the result of re-vaccination. All were inoculated in 6 places; most of them from infants. Their average age was 11½.

GIRLS:

Previous marks	8 in 1	Re-vacc. vesicles	6 in 23
	7 „ 1		5 „ 13
	6 „ 5		4 „ 9
	5 „ 6		3 „ 4
	4 „ 12		2 „ 8
	3 „ 9		1 „ 6
	2 „ 20		0 „ 2
	1 „ 10		Ill „ 1
Small-pox previously	„ 1		
Do. at the time	1		66
Total	66	of these 2 took thoroughly.	

BOYS:

Previous marks	8 in 1	Re-vacc. vesicles	6 in 39
	7 „ 3		5 „ 24
	6 „ 13		4 „ 16
	5 „ 13		3 „ 13
	4 „ 16		2 „ 4
	3 „ 18		1 „ 5
	2 „ 24		0 „ 4
	1 „ 19	Ill, and not vaccd.	2
Small-pox previously	5		
	112		112
		of these 9 took fully.	

The 5 small pox cases had respectively on re-vaccination 4, 3, 2, 2, 0, vesicles.

Total number 178; of which 11 took fully; 157 modified; 6 failed; 4 not vaccinated.

The following points have struck me:—

The almost invariable susceptibility to the irritation of the vaccine virus. About one fourth failed on the 1st attempt, a few on the 2nd, but only 6 (4 boys and 2 girls) on the 3rd and last trial. 11 succeeded perfectly, as shewn by the pocks, their stages and duration, also by re-inoculation, and subsequent pitting. In the others, where it was modified by previously successful vaccination, the eruption ran a rapid course, but did not pass beyond the vesicular stage. In some, even this point was hardly arrived at; in others, there was a more or less distinct central depression. None but the preceding 11 maturated, or were attended with fever.

The almost invariable absence of pitting in the modified forms, the only trace being a temporary stain. 5 boys were at the time suffering from eczemal eruptions on the face or scalp. In these the pocks ran at first through the same stage as the modified form, but healed badly, taking on the appearance of the previous eruption. A similar effect followed in 7 other cases, doubtless from the same constitutional tendency. The children who had suffered from small-pox appeared equally susceptible with the others. Of the 6, two failed after 1st, one after 2nd, and one after 3rd attempt.

The bastard vesicle, tried in 4 cases, was apparently equally powerful with the well-formed one.]

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4. In the ORPHAN WORKING SCHOOL, HAVERSTOCK HILL;—by HETMAN C. HARRIS, Esq., F.R.C.S.

I HAND you herewith a copy of the statement of our deaths and removals from sickness, at the Orphan Working School, Haverstock Hill. I have been Surgeon-apothecary to that Institution over 18 years; for 11 years at the City Road Asylum; and for 7 years at the Asylum at Haverstock Hill. The general state of health at both localities has been most satisfactory. The children, before being admitted as candidates for election, are medically examined and approved; and again before final admission after their election. All must have been vaccinated successfully; and where the marks of prior vaccination are feeble and nearly effaced, I take some opportunity while in the school to test success by a re-vaccination. I have thus tested, in the 18 years, 47 children, and never yet got one case to run its proper course; consequently, I have never *successfully* re-vaccinated any of our children. All appear to be protected, so far as vaccination protects from small-pox. But, twice in the 18 years, occurring simultaneously with visitations of chicken-pox, 3 cases of modified small-pox, very mild indeed, have occurred. One case only was ill enough to be removed temporarily to the Small-pox Hospital, and that was in the year 1853. We have infirmaries within the building, and treat therein all illnesses but small-pox and scarlet fever: the latter, from its extreme contagiousness, is sent to the Fever Hospital.

Our children have all lost one or both of their parents; and 85 per cent. are made orphans by reason of phthisis in the parent or parents. Mild forms of strumous ophthalmia, and eruptions of eczema, herpes, and impetigo, are our most numerous classes of medical cases; and it is always from among those children who will not take any vegetable matters in their diet beyond potato that the most numerous and troublesome forms of these specified skin diseases are manifested. We have not many of them ever in any given year; but the same child, or children, suffer from similar skin eruptions, year after year. Very rarely any fresh case occurs in a child; the same old faces repeat over and over again. I ascribe the few cases of strumous ophthalmia which occur, mild as they generally are, to the high, cold, exposed position of Haverstock Hill, and to the north aspect of our playgrounds, where our children play with bare heads, summer and winter. But still, for the descendants of phthisical parents, our children have but little illness from any forms of strumous disease.

Our numbers in the City Road Asylum used to vary between 70 and 100; nearly between 85 and 90 up to 1840. After that year, the numbers rose to over 100; and in 1846, to over 140. Since we removed to Haverstock Hill, our numbers have ranged between 250 and 270. Children are eligible between 7 and 14 years of age; but must be admitted before 11 years of age. I have passed my medical and surgical superintendence over more than 1000 children, among whom I have never seen any ill effects due to vaccination. All have been carefully vaccinated; and I have never obtained a successful re-vaccination from among them.

Only 3 cases of modified small-pox have occurred in 18 years, notwithstanding that traces of that infection have, lightly perhaps, but epidemically, visited the metropolis within the same period. All 3 cases were very mild, and all recovered very early and well.

I have the honour to be, also, surgeon-apothecary to the Boys' Mission Home, Mornington Crescent. In that Asylum, now 5 years established, the children are of the ages between 7 and 14 years. All are the sons of missionaries in various stations. Many come from Africa, many from the Indies, East and West; some from parts of Eastern Asia; and some from stations in the Isles of the Pacific. Nearly half of the scholars at that school have a mixed blood, from parentage through native races; of course, oftenest on the maternal side. All, before admission into that school, must have been successfully vaccinated; and I have seen above 100 children at that school, which enlarges my experience in quite a different channel. From the admixed blood and race of many of these children, I have no reason to doubt the efficacy of vaccination; and I will answer for its propriety, seeing that I have in no one instance known any ailment, affection, or disease attributable to it in the least degree.

My experience of the accidental eruptions which annoy the Public, and vex the surgeon, is most derived from my position as Public Vaccinator for a district of the poor and very populous parish of St. Luke, Middlesex, which district comprises nearly one quarter of the parish, or about 14,000 souls; and in which the children of the Parochial Workhouse, and of the Lying-in Hospital, in the City Road, are both comprised. I have been a District Vaccinator ever since the first Vaccination Act was passed. Within that period I have vaccinated above 2,300 children, and have very very rarely had any complaints from others, or seen cause to suspect vaccination to be the cause of eruptions, or any other kind of diseases. It seems to me even to be absurd to take the trouble of refuting such idle talk as we sometimes hear. I do believe that the grossest exaggeration prevails in respect to ascribing the spread of eruptions to vaccination. A few cases are multiplied by gossip into numbers; and one particular is made an occasion of asserting generalities: at least, under very ample experience, such is my own sure conviction.

The most certain source of humours, eruptions, skin affections, &c. following vaccination, is the practice of mothers postponing it under any and every pretext, until, as they fancy, their infant is old enough to bear it; by which time, first dentition is actively progressing, and in unhealthy, ill-fed, ill-lodged children, eruptions known well as 'tooth-rashes' (various forms of eczema, herpes, impetigo, and porrigo), are pretty frequently present. If you vaccinate at this time, these eruptions are not turned into any other disease by vaccination; but they are made worse and more protracted. On the other hand, some parents come so early for vaccination to be performed, that you cannot yet determine whether, from suckling, a crop of Crusta Lactea, or 'Milk 'scall,' will not trouble their infants. If you vaccinate these thus early, some will break out at that particular time, hastened probably by the irritation of the vaccine vesicles; and vaccination will be charged with the whole disease.

Vaccination, again, gets discredit from the fact that no preparatory medicines are administered before it is performed; and none, except in private practice, are given after it has succeeded. The price of the 'contract 'vaccination' precludes the furnishing of any medicines into the bargain, which is already a poor one. Besides, medical men have grown to speak slightingly of this necessity; and the public now believe that no preparation is required, and no after medicine is needed, in any case; except, perhaps, the nurse's favourite dose of " a drop of castor oil "

Allow me to suggest that if the operation of vaccination be performed between the 3rd and 4th month; preparing the recipient by a few doses of alterative medicine, and altering faulty diet either through the mother's milk or the feeding pot, both before, at, and after the time of vaccination; taking the matter from a healthy arm between the 8th and 9th days; avoiding visible skin affections as sources of supply, even when most pressed for lymph (for better use none, than take it from an impetiginous arm), and avoiding as sources of supply all children able to walk, who come heated and flushed with exertion before you (for matter taken thence will produce, besides its own reproduction, suppurative inflammation in the axillary, and perhaps also in the cervical superficial glands and abscesses), avoiding also notoriously strumous sources of lymph; and then, using these precautions, tie down the opponents to vaccination to specific points of charge against it (not try to follow and refute loose rambling gossip), and but few evils will follow from vaccination, either in actual practice, or in their wild morbific fancies.

I warmly advise all friends to the practice of vaccination to use but ordinary care and circumspection in its performance, and then no evils will detract from its merits; and no medical man can declare with truth that vaccination is not still, and has not been for more than half a century, the greatest blessing that medical science and art have conferred on mankind.

I think I should add that the present vaccine vesicles are hardly equal to those obtained 30, 20, and 15 years ago. But I do not believe that this detracts from the efficacy of vaccination.

In the 36 cases above referred to, the illnesses which occasioned death or removal were as follows:

Phthisis, 10; Scarlatina, 4; Acute Inflammations, 5; Nervous Diseases, 2; Fever, 1; Disease of Bones or Joints, 4; Incontinence of Urine, 4; Internal Strangulation, 2; Strumous and Glandular Affections, 4.

5. In the LONDON ORPHAN ASYLUM;—by D. DE B. HOVELL, Esq., F.R.C.S.

No evidence has come before me of vaccination deteriorating the health. In assertions to the contrary due allowance is not made, in my opinion, for the difference between the "post" and the "propter hoc." I have no reason to think that vaccination predisposes to typhus, phthisis, glandular swelling, or cutaneous eruptions, or the propagation of hereditary diseases. Of course, due care must be taken that the lymph is taken from a healthy child, and not after the expiration of seven days, or rather 168 hours; this last is an important point. After the areola has once commenced, the matter becomes less effectual and more irritating. Also the same lymph will affect different children differently.

I have had medical charge of the London Orphan Asylum for 6 years; that is to say, of 400 children, from 8 to 15 years of age; and from 200 to 300 other children, from birth to 15 years, for a period of 14 or 15 years. Many children of the Orphan Asylum are necessarily delicate. Obviously, the prevailing disease among them is struma, in its various forms. Scarlet fever, typhus fever, measles, mumps, &c. have at different times prevailed among them, but never under circumstances indicating any connexion with vaccination. I have twice re-vaccinated almost the entire school, with a view to test prior vaccination, and secure immunity from virulent or unmodified smallpox. Now, if vaccination had the effect of producing disease, surely some evidence would have shown itself after these re-vaccinations; but, on the contrary, the health of the children has manifestly improved, under improved ventilation, diet, hygiene, &c. The total number of deaths in 6 years has been 16; from phthisis 6, from tubercular disease 4, from pneumonia 1, from peritonitis 1, from scarlet fever 1.

The other children I allude to are those of the Hackney Union, who have been as closely vaccinated, or rather re-vaccinated, and they are very healthy.

Whether secondary or tertiary syphilis be communicable by vaccination, I have had no evidence. I believe, however, that secondary symptoms are capable of being thus communicated. Much depends on the state of the health of the child vaccinated. The same lymph will produce a normal vesicle in one child, and one attended by severe inflammation and eruption in another.

I am decidedly of opinion that not only is the power of the lymph impaired when taken after 168 hours, or after the areola begins to show itself, but also that the protective power of the lymph is maintained, and even improved, by being taken on the 7th or even the 6th day. The cause of this is obvious; when the areola forms, the lymph becomes more or less purulent in its character.

6. In the ROYAL FREEMASONS SCHOOL FOR FEMALE CHILDREN, WANDSWORTH;
—by THOMAS S. HOWELL, Esq.

MY professional services to the Royal Freemasons School for Female Children have extended over the last 4 years, since their removal from the Westminster Road. Most of the cases that have come under my care since their residence here had been more or less under medical treatment previously. Feeling that this short period would not assist you much, I have availed myself of the kind services of the Secretary (Mr. Crewe) who has given me a statement of the deaths, &c. since his appointment in 1842 up to the present time.

There are 65 children in the school; aged from 7 to 15. No child is eligible for election unless previously vaccinated.

I have no reason to connect the illness or diseases of any of the children with vaccination. And, though glandular swellings did form the principal cases requiring treatment, yet, since their residence here, those cases have all done well, which makes me believe that the locality was in fault. And further, I have always found that their parents were unsound, and that one or both had died early in life.

Cutaneous eruptions are very rare. We have had but one case (*lepra vulgaris*) in 4 years; the child's relations were suffering from the disease. Only one child has been removed in my time for an old standing hip disease. The Secretary's paper will give you the information you ask on the subject of deaths.*

During the present Secretary's appointment (lasting 14 years) 292 children have been admitted into the School; and, during that time, 2 cases of smallpox have occurred. The cases did well. There have been 4 deaths in the last 4 years: 1 of scrofula, 1 of cholera (in 1854) 1 of phthisis, and 1 of effusion on the brain.

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* **Return of the Number of Children who have died in the School in the fifteen years, 1842—1856.**

Description of the Fatal Disease.

TOTAL 25	Consumption.	Scrofula.	Effusion on Brain.	Cholera.	Heart Disease.	Fever.
	12	5	3	2	2	1

7. In the INFANT ORPHAN ASYLUM;—by R. L. PINCHING, Esq., Surgeon to the Asylum.

STATISTICS of the POPULATION and DEATHS during 28⅚ YEARS, (from January 1828, to October 1856, inclusive,) from a RETURN prepared by the Secretary.

Year.	Children under care.	Deaths.	Year.	Children under care.	Deaths.
1828	20	1	1844	241	8
1829	37	1	1845	264	3
1830	53	0	1846	291	7
1831	69	2	1847	337	9
1832	74	0	1848	358	4
1833	85	5	1849	381	15
1834	84	10	1850	451	19
1835	89	2	1851	432	7
1836	105	0	1852	438	18
1837	129	3	1853	441	5
1838	146	0	1854	426	5
1839	168	6	1855	438	16
1840	187	7	1856 (Oct. 28.)	458	Nil
1841	204	5			
1842	227	12	Years 28⅚ . .	6,860	179
1843	227	9	Per annum . .	237·9	6·2

Mortality at the rate of 26 per 1000 per annum.

Children are received in this institution from the age of three months to that of seven years. The total number hitherto admitted is 1.554; so that the average stay of each ($\frac{6860}{1554}$) has been about 4½ years. Taking the aggregate strength for the 28⅚ years, deaths have occurred at the rate of 2·6 per cent. per annum. Of the 179 deaths, 82 were by measles, hooping cough, and scarlatina; 24, by complaints of the nervous system, besides 4 by teething; 23, by consumption; 18, by inflammations of lungs, air passages, and bowels; 5, by heart disease; 3, by fever, typhus, bilious, or gastric; 2, by spinal disease; and 2, by scrofula.

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8. In CHRIST'S HOSPITAL, LONDON;—by THOMAS STONE, Esq., F.R.C.S.

THE children of this hospital are eligible from England, Scotland, and Ireland. They belong to various classes of society, and are never admitted without previous vaccination. So far, therefore, they present a fair field for an investigation of this nature. I furnish you, on the accompanying paper, with a list of the diseases and deaths that have occurred in the London Establishment, during the last 6 years, with the number of children within its walls in each year.

The average number of children admitted for the 6 years amounts to 885⅙; the deaths from all causes, including accidents, within and without the walls, to 31; or, at the average rate of about 5⅚ in 1000 annually.

In analysing this table it will be perceived that the greatest number of deaths took place from an epidemic disease, viz. scarlet fever; then phthisis pulmonalis and mesenteric disease; next cerebral inflammation; next, rheumatic heart-affection, &c.

I cannot conceive it possible that vaccination could have in any way influenced the above-described mortality, as it is evident that some of these affections are hereditary, and others the result of accident, exposure to cold, &c.

My experience and observations at Christ's Hospital extend over a period of more than 21 years; and I affirm that the example of the last 6 years is correctly illustrative of the whole of that time. I would further distinctly state, in answer to your questions, that I have never seen the slightest evidence of the transmission of hereditary and infectious diseases by the practice of vaccination; and, in this vast field, I should surely have witnessed some such effect (syphilis, for instance) if such ever occurred.

The causes of death appear as follows:—Scarlatina, 9; consumption, mesenteric and spinal disease, 8; cerebral inflammation and hydrocephalus, 4; rheumatism, 2; dropsy, 2; small-pox, 1; other complaints and accidents, 5.

DEATHS in CHRIST'S HOSPITAL, London, from 1750 to 1850.

Year.	Total Deaths.	Deaths from Small-pox.	Year.	Total Deaths.	Deaths from Small-pox.	Year.	Total Deaths.	Deaths from Small-pox.	Year.	Total Deaths.	Deaths from Small-pox.
1751	5	0	1776	4	0	1801	3	0	1826	3	0
1752	5	1	1777	10	0	1802	2	0	1827	4	0
1753	0	0	1778	5	0	1803	5	0	1828	6	0
1754	3	1	1779	5	0	1804	5	0	1829	9	0
1755	4	2	1780	8	0	1805	11	0	1830	4	0
1756	1	1	1781	4	0	1806	3	0	1831	1	0
1757	6	0	1782	2	0	1807	6	0	1832	5	0
1758	5	2	1783	2	0	1808	4	0	1833	8	0
1759	5	2	1784	6	0	1809	5	0	1834	3	0
1760	6	0	1785	6	1	1810	3	0	1835	6	0
1761	7	4	1786	6	0	1811	6	0	1836	2	0
1762	5	1	1787	9	1	1812	7	0	1837	5	0
1763	4	0	1788	4	0	1813	5	0	1838	1	0
1764	10	2	1789	4	0	1814	2	0	1839	3	0
1765	3	0	1790	9	2	1815	8	0	1840	6	0
1766	7	2	1791	1	0	1816	6	0	1841	5	0
1767	5	0	1792	5	0	1817	5	0	1842	4	0
1768	11	1	1793	5	0	1818	4	0	1843	0	0
1769	9	0	1794	9	2	1819	3	0	1844	10	0
1770	5	1	1795	5	1	1820	4	1	1845	4	0
1771	6	0	1796	2	1	1821	3	0	1846	5	0
1772	4	1	1797	8	0	1822	5	0	1847	2	0
1773	1	0	1798	5	0	1823	5	0	1848	7	0
1774	5	1	1799	6	0	1824	4	0	1849	6	0
1775	4	0	1800	8	1	1825	7	0	1850	5	0
			Total from 1751 to 1800	264	31				Total from 1801 to 1850	235	1
			Rate per centum per annum	·96	·11				Rate per centum per annum	·59	·0025

Note.—Our chief clerk, Mr. Trollope, informs me that the average number of boys in Christ's Hospital, London, from 1750 to 1800, would be about 550 per annum; and that the average number from 1800 to 1850 would be about 800; so that the good effects of the blessing of vaccination are still more extraordinary. There does not seem to have been any rule at Christ's Hospital before the time of the introduction of vaccination requiring the previous inoculation of a boy prior to his admission. The only manner in which I can account for the *small* mortality occurring, when variola did prevail, is by supposing that many of the children might have already had the disease naturally or by inoculation, and by the fact that directly a child fell ill with the disease he was immediately removed to an isolated building, and the spread of the disease was thereby prevented. The age of admission into the hospital is from 7 to 10 years, and throughout the whole of the period has been subject to little variation. There has always been a preponderance of older boys in London and younger boys at Hertford, and since the year 1837 all boys upon admission have been sent to Hertford without exception. There have consequently been very few boys in London under ten or eleven years of age, whilst the number at Hertford exceeding that age has been equally few. With a few exceptions, the boys quit the school on attaining fifteen years of age.—T. S.

K.

NATIONAL AND OFFICIAL EXPERIENCE OF VACCINATION.

N.B.—Most of the following papers reached me in the form of official translations, and I have only ventured to interfere with their form where, on comparing them with their originals, I have thought some slight change necessary for a more correct representation of the latter.—J. S.

AUSTRIA.

1. Opinion of the Imperial Society of Surgeons at Vienna.

In consequence of a request made by the London Board of Health, the Society of Surgeons were honored with the Commission from the Ministry of the Interior, pursuant to a decree dated the 18th November, 1856, Z 28,191, to give their opinion and the result of their experience in reference to the four questions submitted to them relating to the subject of vaccination. For this purpose the Section for Pathology and Physiology, at their sitting of the 2d January, 1857, nominated a committee, consisting of Dr. Franz Mayer, Surgeon of St. Joseph's Hospital for Children, Dr. Carl Friedinger, House and Vaccinating Surgeon of the Imperial Foundling Hospital, and Dr. Hebra, as President of the Department for Small-Pox at the Imperial General Hospital, to prepare the answers to the said questions according to the judgment of the society, and which were agreed to as follows:—

First Question.—" Has experience taught that successful vaccination secures to persons operated upon " a complete safety against small-pox, and an almost perfect surety against death occurring from this " disease?"

This question requires two answers, for, in the first section, it applies to the security afforded by vaccination against small-pox; in the second, to the danger of death from small-pox to persons who have been vaccinated. In respect to the first section of the first question, which might be put thus—Does vaccination act as an absolute or relative preservative against small-pox?—The society can entertain no other opinion than that which has gained universality through observation made at all times and in all places, viz., *vaccination with cow-pox produces only a relative safety against small-pox.* As proof of this relative preservative power (in addition to the allusion to the fact that since the introduction of vaccination small-pox has been less frequent epidemically and has assumed a milder form), the following figures taken from the experience of the members of the committee will show:—

During the last ten years 202 children were treated for small-pox in the St. Joseph's Children's Hospital, on the Wieden, of whom 74 were vaccinated, and 128 were non-vaccinated; figures which show of themselves that non-vaccinated children are more frequently attacked by small-pox than those who have been vaccinated, but which derive more importance from the known fact that owing to the vaccination laws here, in respect to children at an early period of life, the vaccinated children far outnumber the non-vaccinated. The calculation of the number of patients treated for small-pox during the last twenty years in the Imperial General Hospital of Vienna showed that of 6,213 patients 5,217 were vaccinated, and but 996 were non-vaccinated; a result which might easily lead those who will not believe in the preservative power of vaccination to the conclusion that vaccination, instead of preserving from contagion, only increases the liability to infection from small-pox. This, however, as may be easily understood, is but a false deduction. When it is considered that the great majority of the present population have had the benefit of vaccination during their early youth, and that in the present day there are very few persons to be met with who have not been vaccinated, the number of 50 non-vaccinated persons who, according to the above number, 996, are on the average attacked in one year, may be called very large, and would seem to prove that the few non-vaccinated persons still to be found are more liable to be attacked by small-pox contagion than are the vaccinated, of whom the average yearly number may be stated at 260.

An *equal* liability to infection from variola in the cases of vaccinated and non-vaccinated persons would, according to the above figures, only be admitted if the number of non-vaccinated persons, compared with that of vaccinated persons of the population of Vienna and its suburbs, were as 50 to 260, *i.e.* as 1 to 5½, or, in other words, if out of 11 grown-up persons but 9 were vaccinated and 2 non-vaccinated; a proportion which it is well known does not at the present time exist, and which, as the law rendering vaccination compulsory has existed in Austria for more than 50 years, cannot exist.

The 2d section of the first question — **information as to whether vaccination produces an almost absolute security against death from variola.**

The answer to this is— Vaccination in this instance also affords but a relative security.

It is well known that the danger from small-pox increases with the number of efflorescencies, and declines in the same ratio with a smaller number of pustules. It has therefore been customary, since the introduction of vaccination, to admit of three species of small-pox: viz., a violent and dangerous form called variola vera, which is characterized by its slow progress and breaking out, and by the running into each other of the pustules; in contradistinction to this, the chicken-pox, which always takes a mild form, is not dangerous, either as regards the health or life of the patient, and produces few pustules, which quickly die away. Between these two extremes is the varioloid, or modified small-pox, which (without taking any fixed form) also runs a quicker course, and particularly in the stage of *decrustation*, and very seldom terminates fatally.

If experience teaches us that with vaccinated persons chicken-pox and varioloid more frequently occur than true small-pox, and, in inverse proportion, non-vaccinated persons are more frequently attacked by variola vera than by the milder forms of small-pox, it shews most clearly that through vaccination with cow-pox a mitigation of the morbid process has taken place.

Of the above-mentioned 6,213 cases of all forms of small-pox treated in the General Hospital during twenty years, there were 1,323 of *true small-pox*, 1,475 of *varioloid*, and 3,415 of chicken-pox; and the distribution of these, according to the vaccinatedness or non-vaccinateduess of the patients, is expressed in the adjoining Table.

	Total.	Variola Vera.	Varioloid.	Chicken-Pox.
Vaccinated - - -	5,217	732	1,282	3,203
Per 100 cases - -	100	14·30	24·57	61·59
Non-vaccinated - -	996	591	193	212
Per 100 cases - -	100	59·34	19·38	21·28

Variola vera, therefore, occurs four times as often and chicken-pox three times as often in non-vaccinated as in vaccinated persons, a proportion which evidently decides in favor of vaccination.

As regards the cases of small-pox which terminate fatally, we receive from both the afore-mentioned hospitals the following data: viz., of 202 children treated for small-pox in St. Joseph's Children's Hospital 37 died, of whom 33 were non-vaccinated, and 4 vaccinated.

In like manner, out of the 6,213 adults who were treated for small-pox in the Imperial General Hospital, 571 died. Of these 271 were of the 5,217 vaccinated, and 300 of the 996 non-vaccinated; or, in other words, the average mortality from small-pox during twenty years was 5 per cent. per annum among the vaccinated, and 30 per cent. among the non-vaccinated; (*i.e.* 6 to 1) figures which are too significant to require any comment.

Second question.—" Has experience given grounds for belief or conjecture that vaccinated persons, owing " to their being less liable to infection from small-pox, are therefore more liable to typhus fever or any " other contagious disease, or to scrofula or phthisis, or that their health is in any other way injuriously " affected?"

This question is divisible into three parts,—each of which must be answered by itself.

a. Whether vaccinated persons are more frequently attacked by other contagious diseases, especially by typhus fever?

b. Whether scrofula and phthisis are more frequently met with among vaccinated persons?

c. Whether vaccination has a prejudicial influence on general health?

a. The history of the contagious exanthems teaches us that these have for centuries been the scourge of mankind, and that hundreds of thousands of the human race have been carried off by measles and scarlatina before the slightest idea of vaccination with cow-pox presented itself; and even from observations made during the present century, showing that measles and scarlet fever prevail epidemically less frequently and in a milder form than in former times, one could rather come to the opposite conclusion, and consider this to have been caused by vaccination, were it not that immediately after vaccination, as well as after recovery from small-pox, other contagious exanthems have made their appearance, and accordingly vaccination as well as small-pox is inactive as a preservative against measles, scarlet fever, typhus, &c. Any one who is acquainted with the fact that cow-pox, sheep-pox, and small-pox proceed from the same original contagion, which is sufficiently proved by the experiments of Thiele, Ceely, Gessner, Reiter, Bousquet, Iwanowics, &c., would not expect more from vaccination as a preservative against other diseases than from small-pox.

Different diseases prevent each other, for they *never* appear at the same time in one individual, although they may immediately succeed one another in the same person.

Vaccination can accordingly produce neither measles, scarlet fever, nor any other contagious disease, nor act as a preservative against them.

Against these zymotic (zymotischen) diseases it has no influence.

As far as regards typhus specifically, in order to explain the proportion of this disease to vaccination, statistical evidence is wanted, as to whether *before* or *after* the introduction of vaccination more people were attacked by it.

Without considering the other difficulties and imperfections of such a work, it would be no easy task to collect accurate information, owing to the different nomenclatures of the diseases at different times; for if from the circumstance that in ancient reports of diseases and registers of deaths the name typhus appears less frequently we were to infer that typhus was a disease of modern times, we should be guilty of a great mistake, for our forefathers made a distinction between *febris* (nervosa, putrida, asthenica, adynamica, versatilis, stupida) and *typhus;* and in the present day the correct conception of the last-named disease is not so generally extended but that febris mucosa, pituitosa, gastrica cum nota nervosa, febris typhosa, miliaris, &c. are by some surgeons ranged separately from it.

The great revolution in medicine brought about by sober observation at the bedside of the patient and the dissecting table has thrown overboard a number of names of diseases which described nothing, and retained only those which are necessary to describe different processes. Now as the efforts of pathological anatomy were successful in proving that the diseases formerly known under so many different names were not different diseases in themselves, but were cases of typhus modified in degree by local affection and other circumstances, the comprehension of typhus became more extended, and this name is therefore in the present day more frequently used than formerly. That, no mutual attraction, however, exists between vaccination as a preservative against variola, and typhus, is proved by the circumstance, that during the age of childhood (i. e. between one and two years of age), during which vaccination is generally practised here, typhus is a disease which rarely occurs, whereas in later years, at the time that the preservative power of vaccination gradually declines, the number of cases of typhus increases.

b. In respect to the further question—Whether the liability to infection from scrofulous and tubercular affections is increased?—We must remark that it is certainly undeniable that the state of fever which is produced by inoculation with vaccine lymph, and which is evidenced even long after the conclusion of the vaccine process, by the continuation of the increased frequency of the pulse, may produce an aggravation of one of the diseases already named, but these slight disadvantages are, in comparison with the great safety secured, too unimportant to deserve particular notice.

The assertion often made that now, after practising vaccination for more than 50 years, through which more than half a million of human beings are yearly saved, scrofula, tubercle, and phthisis more frequently appear (and this to an extraordinary degree) than was the case before the introduction of vaccination, as to be explained, on one side, by the circumstance that here, where the population has not for a long time been decimated, either by a continuation of war, or important epidemics, it has very considerably increased, and accordingly more sick persons are to be found among them. On the other side, that, owing to vaccination, scrofulous, tubercular, and ricketty children are preserved from small-pox, to which diseases they would otherwise have certainly fallen a prey.

The afore-mentioned cachexies are conveyed from parents to their children and grandchildren; and the experiment has been tried in many places, of either postponing or entirely omitting the vaccination of scrofulous and ricketty children of such families, without the occurrence of these diseases being prevented.

c. As regards other injurious effects which may be caused by vaccination, they are limited in the great majority of cases to local disturbances, such as follicular or cutaneous inflammation, exudation, and suppuration. Bad results, such as erysipelas, gangrene, formation of abscesses, &c., occasionally occur, but are nevertheless to be considered as inevitable; and in every case, so soon as a cure has been effected, there is no fear of future evil result to the vaccinated person.

> *Third Question.*—" Has experience given grounds for belief or conjecture, that the lymph from a true
> " Jennerian pustule may become the vehicle of scrofulous, syphilitic, or any other contagion, which
> " may affect the bodily constitution of the vaccinated person, or that the accidental inoculation with
> " another disease, instead of the intended vaccination, may take place by the hands of a properly
> " qualified medical practitioner?"

The contents of this comprehensive question also demand different answers, according to the information required, viz.:—

a. Whether the lymph of a vaccine vesicle, in addition to its own peculiar contagion, can contain another infecting principle; ex. gr. syphilis?

b. Whether constitutional, non-contagious diseases, ex. gr. scrofula, may be conveyed by means of vaccination with cow-pox?

c. Whether a vaccine vesicle possesses such characters as to be easily distinguishable from other bladders, blisters, or pustules?

a. The contagious matters hitherto known which may be conveyed by inoculation reduce themselves to chancre matter, containing syphilitic virus, and the contagion contained in small-pox and vaccine vesicles; it remains therefore only to be considered whether these morbid animal products can combine, and whether a vaccination with them so combined has already taken place? And what have been the results of the same?

It is well known that comprehensive answers to these queries have for a long time existed. They were proposed in the Imperial General Hospital in the year 1855, and published in the March and April numbers of the periodical of the Imperial Society of Surgeons.

They are uniform in the opinion, that in cases of vaccination with secretions containing several peculiar descriptions of contagion, either it did not take at all; or in a mixture of chancre matter and vaccine lymph, only chancre took; and on mixing vaccine lymph and blennorhagic secretion, only cow-pox took. Thus only one disease was communicated, either small-pox or syphilis; a proof certainly that both contagions cannot be conveyed at the same time. Confirmatory of this are the experiments of Heim, Ricord, Bousquet, Taupin, Landauzy, &c., &c.

b. Although by many it is maintained that the blood of individuals affected with secondary syphilis can serve as a vehicle for this specific contagion, even this theory (if it could be proved) would not exercise any influence on the practice of vaccination; for both experiments made on purpose (Heim) and accidental vaccinations have taught that without considering the quality of the vaccine lymph, that taken from syphilitic subjects may have been used upon healthy persons, and the contrary, viz., from healthy individuals, and used upon persons suffering from syphilis, without, on such occasions, the latter disease having been conveyed with the cow-pox. What has here been proved in reference to syphilis may be applied equally to all other dyscrasic diseases, since these even, in cases of direct vaccination with their morbid product, have always shown a negative result.

Even if it is proved without doubt that scrofula, tubercle, rickets, cancer, and other diseases of the blood are not conveyable, either of themselves or by means of vaccine lymph, still the vaccination of sick persons is, if possible, to be avoided, since experience has shown that both with children and adults the progress of the vaccination may be the cause of awaking slumbering ailments, or of aggravating them; further, hat the vaccination vesicles with such individuals easily degenerate. Nevertheless, these are perfectly fit for the purpose of further vaccination, even in cases of imperfect generation; for if vaccine lymph taken from weak, scrofulous, and ricketty persons is used upon healthy persons, a complete taking, a more regular course, and more satisfactory safety against small-pox may be observed.

c. In the same manner that in every appearance of disease the general characteristic may be observed which distinguishes it from other similar diseases, so also do vaccine vesicles possess peculiarities enough in their form, size, number, the places in which they occur, and particularly in their progress, to distinguish them easily from other vesicular or pustular eruptions on the skin. So great a knowledge is certainly not necessary to diagnose a vaccine vesicle that one has not the right to presume with safety on such knowledge being possessed by every properly instructed medical practitioner.

Fourth Question.—" Does experience warrant the recommendation (with the exception of special cases) " that vaccination should be practised at an early period of life?"

This question put in the following form would be more short and distinct:—

Should children be vaccinated during the first weeks or month of their life; or later, say in the first or second year of their age?

On this subject the experience of all times agrees. Since the time of Rhazes to the present day it is known to every medical man and every layman, that small-pox is so dangerous to none as to children, particularly to the non-vaccinated infants, newly-born or at the breast.

Out of 195 children who died in the Imperial Foundling Hospital during the period of eleven years, from small-pox (of whom 194 were non-vaccinated) 168 were in the first year of their age, 19 under two years, the remaining seven under ten years.

The rate of mortality among the non-vaccinated small-pox patients in the Imperial General Hospital during the last twenty years, which, for children from four to ten years of age was 40·2 per cent., fell for the next decennial period of life (viz., in respect of persons between eleven and twenty years of age) still more, as their mortality was but 20·4 per cent.

The two following decennial periods appear to bring more danger, as among non-vaccinated individuals of from twenty-one to thirty years of age the proportion of deaths was 36.6 per cent., and of those between thirty-one and forty it was 46·2 per cent.

The ages above forty-one produce too small a contingent to be a guide as to their rates of mortality. Of these latter, four died, *i. e.* 33·3 per cent.

In order to arrive at an idea as to the frequency of attacks of small-pox during the different periods of life, and the amount of safety secured by vaccination, we subjoin the following Tables, which show the rates of mortality among the vaccinated and non-vaccinated patients of the General Hospital during the period above mentioned.

Age.	Total number of Cases.	Vaccinated.		Non-vaccinated.	
		Cases.	Deaths.	Cases.	Deaths.
1–10 - -	418	234	35	184	74
11–20 - -	2,634	2,228	83	406	83
21–30 - -	2,671	2,329	128	342	115
31–40 - -	406	354	21	52	24
41 and upwards	84	72	4	12	4

Deaths per 100 cases at each Age as follows:—	1–10	11–20	21–30	31–40	41 and upwards.
Among 5,217 vaccinated - -	14·9	3·7	5·6	5·9	5·5
Among 996 non-vaccinated -	40	20·4	33·6	46·2	33·3

From these calculations may be deduced that the greatest number of small-pox cases occurs between the ages of 11 and 30; the greatest mortality, however, during the first year of life; then during the first decennium; and, next, between 31 and 40 years of age. If a comparison be made between the great per-centage of non-vaccinated nurselings and little children who die from small-pox, and the small number of cases where vaccination has been prejudicial to health, or has caused derangement of the system, the preponderance is greatly in favour of early vaccination; for in the Imperial Foundling Hospital and Vaccination Institutes 1,000 vaccinations take place yearly on children a few weeks old without the health of these infants being prejudiced or the vaccine lymph deteriorating in quality.

The Society accordingly expresses its opinion, That vaccination not only may be practised without danger upon children but a few weeks old, but even *ought* to be so practised, in order to preserve nurselings from danger of contagion from small-pox.

Carl Rokitansky,
President.
Karl Schroff,
Vice-President.
Jos. Skoda,
Fred. Hebra,
Reporter.

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2. Report of the Faculty of Medicine at Prague.

To the Ministry of the Interior,

The undersigned College of Doctors of the Faculty of Medicine of the City of Prague (College of Surgeons) in fulfilment of an order dated 18th November, 1856 $\frac{28191}{2214}$, viz., to procure replies to the questions submitted by the Government of Great Britain relative to vaccination, has the honour to remark to the Ministry as premise to the following statements, that in consequence of the importance of the subject, it feels itself compelled to adhere solely to well-founded facts and the known results of experience, and supported by these alone, setting aside all theoretical and subjective remarks, to make use of such results and data alone as appear adapted to answer the different points in these questions, in accordance with the present state of scientific knowledge.

I. Has experience, &c., &c., taught that successful vaccination acts as a complete preventative against the small-pox, and secures an almost certain safety from death occurring through this disease?

The answer to this question, which most closely touches the principle of cow-pox vaccination, is to be arrived at by means of the official data shown in the four annexed tables.

Table I. showing the number of population, the general amount of mortality, and particularly from small-pox, during the seven year epoch from 1796 to 1802, at which time cow-pox vaccination was either not practised at all in Bohemia, or at any rate not in the extensive manner in which it is practised in the present day.

Table II. shewing the same data after the general introduction of vaccination into Bohemia for the period of 24 years, from 1832 to 1855. These two tables are compiled from the official bills of mortality, with the exception of the year 1855, for which year (the official list not being completed) the total number of deaths was assumed to be the same as the preceding year.

Table III. shewing the number of deaths among the vaccinated and non-vaccinated, the number of both who sickened and died from small-pox during the period of 21 years, from 1835 to 1855.

The discrepancy between the deaths from small-pox in this table and those in the former, No. II., is to be explained by the fact of the latter being taken from the general returns of deaths, in which those cases are included which have been returned by non-professional "examiners of the dead," who frequently enough look upon every disease in the form of an eruption on the skin as small-pox, and accordingly consider this disease as having been intimately connected with the cause of death, whilst the statement in Table III. is prepared from the return of the vaccinating surgeon, and has therefore more pretension to be worthy of credence.

This difference is in so far of little importance that in No. III. Table all vaccinated individuals who died are to a certain degree charged to vaccination, whereas only those who were successfully vaccinated should have been so charged.

If proof of the latter could be given, and if it were possible in Table II. to give the number of population of each year, the proportion of small-pox and death to the population in general on the one hand, and that of the cases of small-pox to the successfully vaccinated on the other hand, would present itself in a much more favourable light.

Table No. IV. contains a statement as to re-vaccination during the last sixteen years, from 1840 to 1855, in comparison with vaccination, and would seem to show that, in the majority of cases, at the time of re-vaccination, the effect of the first vaccination had not yet ceased.

From these tables, it appears,—

1. That according to I. and II. the total number of deaths, as well before as after the introduction of vaccination with cow-pox, was 1 · 32 to the number of the population.

2. Before the general practice of vaccination, there occurred one death from small-pox in 12⅓ deaths in general, and in 396⅔ souls; but after the general introduction of vaccination, the proportion fell to one death from small-pox in 457¾ deaths in general; and in 14,741⅓ souls, therefore,

3. The proportion at the present time of deaths from small-pox to the deaths in general is thirty-eight times, and to the population thirty-seven times more favourable.

4. The lowest number of deaths from small-pox before the introduction of vaccination (1988) is 2⅓ times greater than the highest number since the introduction of vaccination (807), therefore the highest number of deaths from small-pox before the introduction of vaccination (17,587) is 21⅘ times greater than the highest number of deaths since the introduction of vaccination (807); and further,

5. According to Table III., there occurs on the average one case of sickness from small-pox in 36 7⅔ and one case of death from small-pox in 7,166⅓ among the vaccinated, whilst among the non-vaccinated on, in 12⅓ was taken ill with the small-pox, and one in 40⅔ died from that disease; thus the nineteenth part of the vaccinated, but the third part of the non-vaccinated, died from small-pox, and of the non-vaccinated thirty times the number were taken ill with, and 179 times the number died from, the small-pox, than of the vaccinated.

6. According to Table IV., in cases of re-vaccination, among 100 re-vaccinated individuals 38⅘, *i.e.* somewhat above one-third of the re-vaccinations proved successful, with 59⅖ no success was obtained, with 1⅘, the result remained unknown; whilst among 100 vaccinations, 97⁵⁄₇ were successful, 2 no result, and ²⁄₇ the result remained unknown, therefore the proportion of successful re-vaccination to vaccination cases is proved to be as 1 to 2¼. To this calculation, the experience obtained in our city hospitals and by private practitioners, not only offers no contradiction whatever, but on the contrary, it is even more favourable.

In the Imperial General Hospital of Prague during ten years, from 1847 to 1856, 872 persons were treated for small-pox; of these, 819 had been successfully vaccinated, and 43 unsuccessfully or not at all. With 10 the vaccination, or its result, could not be ascertained in a manner to be relied upon. Here must be particularly remarked that in 1847, in the afore-mentioned institution, not one case of small-pox is recorded.

Out of the 872 patients, 63 died, and of this number 41 were of those who were described as successfully vaccinated, 20 as vaccinated without success, and two as those concerning whose vaccination nothing certain was known.

Leaving alone those concerning whose vaccination nothing could with certainty be said, it is here shown that of the successfully vaccinated, the twentieth part died; of the unsuccessfully vaccinated the half, whilst the number of vaccinated patients was nineteen times greater than that of the non-vaccinated.

In the Hospital of the Brothers of Mercy at Prague, during the years 1847 to 1856 inclusive, 410 patients were treated for small-pox; of these, 370 were vaccinated, and only 40 non-vaccinated. Of the vaccinated 4 died, of the non-vaccinated 5 died.

Of the vaccinated (the success or non-success of the vaccination not being taken into consideration) the 92nd part died, of the non-vaccinated the 8th part died, whilst the number of the vaccinated was $9\frac{1}{4}$ times greater than that of the non-vaccinated.

In the Emperor Francis Joseph's Children's Hospital at Prague, between the years 1854 and 1856, *i.e.* during a period of three years, 263 sick children were treated for small-pox; of these 75 were vaccinated, and 188 non-vaccinated. Of the vaccinated none died; of the non-vaccinated 30 died; that is to say, almost 16 per cent.

In the Elisabethian Hospital in Prague, during six years, from 1851 to 1856, 118 cases of small-pox were admitted, of these 108 were vaccinated and 10 non-vaccinated. Of the vaccinated, 2 died, of the non-vaccinated 1 died; *i.e.* $\frac{1}{54}$ of the vaccinated, and $\frac{1}{10}$ of the non-vaccinated. The vaccinated patients being $10\frac{4}{5}$ times the number of the non-vaccinated.

In the opinion of the undersigned College of Surgeons the whole of the foregoing information justifies the following conclusions:—

1. Small-pox not only may, but does, attack even persons who have been successfully vaccinated.
2. Death from small-pox occurs not only with non-vaccinated, but also with vaccinated individuals.
3. Vaccination with cow-pox does not therefore secure a certain safety from small-pox.
4. The number of small-pox cases in general (vaccinated and non-vaccinated) in proportion to the number of the population, is at the present time unproportionably smaller than before the introduction of vaccination.
5. If the proportion of small-pox patients who have been vaccinated greatly exceeds that of those who have not been vaccinated, this fact must not be lost sight of, that in the present day (in this country) the population of non-vaccinated individuals is very much smaller, and with the spread of vaccination for cow-pox, it decreases each year.
6. The greatest number of small-pox cases which terminate fatally in the present day is not only much lower than the highest number during a like period, in times before the introduction of vaccination, but even in an extraordinary degree lower than even the lowest number in such former times.
7. The great variability of the small-pox cases, and deaths observed in the different years in Table III., shows that now as formerly the small-pox at times takes a greater range; at the same time experience teaches,
8. That in comparison a greater number of non-vaccinated persons (notwithstanding their great minority) are attacked with small-pox, and die, in almost the same proportion, as before the introduction of vaccination; whilst,
9. As regards vaccinated persons, notwithstanding their overwhelming majority, the favourable comparison shows itself in an extraordinary manner, insomuch as the cases which terminate fatally may almost be termed singular, when it is taken into consideration that in forming these conclusions only the successful cases of vaccination could be reckoned.
10. As regards the preventive power of vaccine, the result and proportion of vaccination on non-vaccinated (vaccination) and vaccination on vaccinated persons (revaccination), may be referred to, vaccination being with the great majority of the latter unsuccessful.
11. According to what has already been shown, there appears such a striking difference in the proportion of sickness and death from small-pox before and after the introduction of vaccination, and with vaccinated and non-vaccinated persons, that every unbiassed individual can figure to himself the answer to the first question proposed.
12. It is undeniable, and not to be contradicted, that vaccination as a measure of safety against small-pox is of great value, that vaccination produces relative safety against this disease, and that death from small-pox is of seldom occurrence among vaccinated individuals.

II. Has the experience, &c. &c., given grounds for belief or for presumption that vaccinated persons, who are therefrom less liable to infection from small-pox, are more liable to infection from typhus fever, or any other contagious disease, or to scrofula, or phthisis, or that their health is injuriously affected in any other manner?

There is no well-grounded fact known which would justify the assumption that vaccinated persons are more liable to typhus or other contagious diseases, or to scrofula or phthisis, than non-vaccinated persons, or that the health is in any way injuriously acted upon by vaccination.

Typhus fever and other contagious diseases, scrofula, and tubercle, if these diseases here and there appear, are occasioned by quite different causes, which up to the present time are just as far from having been discovered as the cause of small-pox itself.

Particularly the origin of scrofula and tubercle is found in the social condition generally, and especially in some classes of the human race, in a much more important moment than that of cow-pox vaccination, in

RE-VACCINATION and SMALL-POX in the ARMY of BADEN, during Twelve of the Years 1840–55.

YEAR.	Number re-vaccinated.	SIGNS OF PREVIOUS PROTECTION.				RE-VACCINATED.				RESULT.						CASES OF VARIOLOID AND VARICELLA IN THE ARMY.		
		Marks of previous Operation.		Marks of Small-pox.	None.	With Lymph of Primary Vaccination.		With Lymph of Re-vaccination.		Perfect.		Spurious.		None.		In Men whose Re-vaccination had had a Result.	In Men whose Re-vaccination had had no Result.	In Men not Re-vaccinated
		Distinct.	Indistinct.			For the first time.	For the second time.	For the first time.	For the second time.	With Lymph of primary Vaccination.	With Lymph of Re-vaccination.	With Lymph of primary Vaccination.	With Lymph of Re-vaccination.	With Lymph of primary Vaccination.	With Lymph of Re-vaccination.			
1840	3,170	3,015	118	15	22	1,276	12	1,831	51	314	521	397	821	577	540	—	—	5 cases of varioloid.
1841	3,573	3,153	300	108	12	599	6	2,660	308	243	900	139	766	223	1,302	—	—	9 cases of varioloid.
1842	3,616	3,417	175	5	19	483	30	2,476	648	183	912	122	802	217	1,380	—	—	2 cases of varioloid.
1843	3,400	3,249	111	11	29	637	57	1,953	748	378	1,199	160	573	156	934	—	1 case of varioloid.	1 case of varioloid.
1844	3,891	3,772	78	6	35	648	320	2,103	730	335	829	281	803	351	1,202	—	1 case of varioloid.	7 cases of varioloid.
1845	3,928	3,760	125	14	29	776	2,006	230	916	342	1,025	150	625	528	1,258	9 cases of variola* 2 cases of varioloid.	13 cases of varioloid.	—
1846	3,741	3,647	54	9	31	502	227	2,340	672	300	1,167	151	476	278	1,369	—	—	1 case of varioloid.
1847	3,491	3,412	50	2	27	728	156	1,947	660	350	1,030	102	491	382	1,067	—	—	—
1851	5,574	5,167	353	17	37	1,348	563	2,757	906	600	1,124	451	739	860	1,800	1 case of varioloid.	—	—†
1853	3,672	3,344	278	9	41	895	337	1,486	954	447	737	290	448	518	1,223	—	—	—‡
1854	3,666	3,503	134	9	20	989	324	1,782	571	437	904	255	402	627	981	—	—	—
1855	4,591	4,312	214	47	18	1,343	203	2,147	898	643	1,142	253	529	645	1,374	—	—	—
	46,313	43,751	1,990	252	320	10,224	4,250	23,777	8,062	4,577	11,409	2,820	7,335	5,362	14,520	12	15	25

* Query—Whether this has not been a clerical error for varicella or chicken-pox? See title "Varioloid and Varicella."—J. S.

† Political circumstances occasioned the re-vaccination of the army to be interrupted during the three years 1848–50.

‡ The Re-vaccination Statistics of 1852 are too incomplete for use in the Table.

BAVARIA.

I. Experience hitherto made in Bavaria shows it to be not very rare that individuals successfully vaccinated are yet attacked with a variola-like eruption; such small-pox-like eruptions in vaccinated persons are, however, in almost all cases, but slight diseases; they are rarely dangerous, and very rarely fatal. Such small-pox-like eruptions in vaccinated individuals, called varioloid, are of very various form, the slightest being that of vesicles occurring diffusedly in very small numbers; they can, however, assume the form of perfect small-pox, and be met with in great numbers, in which latter degree they can turn out to be dangerous, nay even fatal. The course of varioloid, except in its severest forms, is, however, always much shorter than that of variola in not vaccinated individuals.

II. It has not been observed in Bavaria that vaccinated persons are particularly liable to other diseases. Although general and compulsory vaccination has been performed in Bavaria during two generations, and accordingly all individuals have been vaccinated in their earliest age, there are still provinces in our country in which typhous fevers and scrofula are of extraordinarily rare occurrence. The same statement can be laid down in relation to other contagious diseases of children and grown-up persons, and to diseases of the lungs. No prejudicial influence of vaccination upon vaccinated persons has been observed in Bavaria. If, in former times, out of 1,000 born individuals 71 died of small-pox, it is quite a matter of course that in our times, since vaccination has rendered small-pox almost harmless, the number must be filled up by other diseases, because, otherwise, 71 out of 1,000 born individuals should by needs be immortal; that is to say, that, as a necessary consequence of vaccination, 71 individuals out of 1,000 more than in former times must actually die of other diseases than small-pox; those 71 cases of death are, however, distributed in many diseases, and no single disease is charged with a strikingly great number.

III. In Bavaria, up to the present time, two cases have happened, of syphilis being inoculated with vaccina, to the misfortune of several families. That was, however, in each of those cases the fault of the vaccinating physicians themselves; and the accident could in either case easily have been avoided, since syphilis was unmistakeably present in the children from whom lymph was taken. Other diseases cannot well be inoculated through vaccination, more particularly scrofula, which contains no contagious matter, and therefore cannot be propagated by means of inoculation. The inoculation of syphilis can at all times be avoided by an observant surgeon, who uses due circumspection in choosing the subject from whom he will take lymph for vaccination.

IV. It results from the experience made in Bavaria that general vaccination carried out in early youth must be looked upon as an indispensable measure for resisting small-pox with energy and success. For wherever it is left optional to get or not to get vaccinated, there a great many people, from ignorance, heedlessness, and indolence, will remain unvaccinated, and afford, as it were, a continual focus of small-pox, whence its infection will always be diffused anew and preserved. The necessity of carrying out vaccination in early youth is likewise evident from the fact of children in their earliest age being liable to small-pox, and, unless vaccinated in time, being in constant danger. Bavaria in 1807 was the first state that introduced vaccination as a compulsory measure; since when it has been law that children should be vaccinated early in life; and under the present law there is ordered to take place between the 1st of May and the end of July in every year the vaccination of all children born in the preceding calendar year, excepting such as are ill at the time. In Bavaria, hitherto, no reason whatever has been found to depart from this system; which, on the contrary, is looked upon as the only one adapted for attaining all the advantages of vaccination.

NOTE on RE-VACCINATION of the BAVARIAN Army.

According to information received from the Royal Ministry of War, it appears that,—

(1) Since the year 1843 the practice of re-vaccination has been regulated in the Bavarian Army in such manner as to be made compulsory on every soldier newly joining, whether non-commissioned officer or private; and—

(2) that since that date absolutely no cases of *variola* (that is, genuine small-pox) have occurred in the Bavarian Army; while of cases of *varioloid* (that is, small-pox modified by previous vaccination) which from time to time do appear, though in small number, there has not within this period occurred a single death.

DENMARK.

1. KINGDOM.

IN reply to sundry questions bearing upon the influence of vaccination, submitted by Her Britannic Majesty's Government, the Board of Health begs to state as follows:—

I. Vaccination must be regarded as the best means that has hitherto been discovered for the preservation from small-pox. Experience proves that but a comparative small number of those vaccinated take the disease, and even then it is generally found to be of a milder form (varioloid), so that the mortality from small-pox, which previous to the introduction of vaccination amounted to fifty per cent. of those affected, has since the introduction of vaccination fallen to a very low amount, say from one to five per cent. during the various epidemics. It must be observed that our experience confirms the opinion, that the anti-variolous powers of the vaccine virus are wearing out, or perhaps, even entirely disappearing, after a limited number of years, as during the epidemics of later years, small-pox attacked a comparative greater number (and in a more violent degree) of those who had been vaccinated from ten to fifteen years ago, than of those vaccinated within a more recent period. This assertion is corroborated by the fact, that while revaccination, generally speaking, is unsuccessful, or, at any rate, only produces imperfect (spurious) pustules, in those vaccinated a few years ago, the reverse is the case with those who have been vaccinated from ten to fifteen years ago. As an instance, we may quote that on the 11th November this year, twenty-eight boys of from fourteen to fifteen years of age were vaccinated in the Vaccination Establishment of this town; and out of these, who had all been vaccinated in the first biennium, twenty-four had the vaccine vesicles fully developed, and only four had spurious ones.

II. Our experience has not demonstrated that vaccinated individuals, in becoming less susceptible of small-pox, should become more susceptible of typhus, other contagious diseases, scrophulosis, phthisis, or that their system should in any shape be acted upon in any mischievous degree. Experience furnishes us even with a negative proof of the reverse. At the commencement of the present century vaccination was ordained by law and introduced into the Feroe Islands, as it was in the rest of Denmark, yet among the population of these islands, amounting to 8000, diseases such as scrophulosis, phthisis tuberculosa, syphilis, and febris intermittens are quite unknown.

III. The experience which we have acquired in this country does not lead to the supposition that lymph taken from true vaccine can be the means of communicating any scrophulous or constitutional contagion. As for syphilis, particular attention has always been paid in not taking lymph from an individual suffering or suspected of suffering from that disease. During the fifty years that have elapsed since the introduction into Denmark of vaccination, only two syphilitic cases have occurred that appeared questionable—one after vaccination and one after revaccination. Such cases may, as in other countries, have given rise to the notion that they originated in vaccination, but they are few and far between, and not supported by facts.

IV. It is well known that vaccination has been ordained by law in this country, so that no child can be admitted into a school, or present itself for confirmation, unless a certificate of having been vaccinated be produced, and experience has proved the efficacy of the law. The repeated vaccination (or revaccination) is also enjoined for soldiers and sailors in the navy, and experience has likewise shewn the successful results of this law, inasmuch as these two classes of individuals during several variolous epidemics have almost entirely escaped the contagion.

COPENHAGEN.

Year.	Population.	Mortality.	Excess of Deaths over Births.	Excess of Births over Deaths.	Died of Small-pox.	Remarks.
1750	60,000	4,317	1,571	- -	1,457	The population is by calculation.
1751	- -	2,798	17	- -	80	
1752	- -	2,594	2	- -	113	
1753	- -	2,845	300	- -	53	150 carried off by the measles this year.
1754	- -	2,542	- -	221	9	Inoculation first introduced into Denmark. (Countess Bernstoff, by Dr. Argent, of London.)
1755	- -	3,821	1,152	- -	1,117	Two inoculation hospitals erected, each for 6 persons.
1756	- -	2,792	139	- -	125	
1757	- -	3,700	1,100	- -	13	Measles and dysentery prevailed this year.
1758	- -	4,761	2,354	- -	13	Likewise very fatal. 420 carried off by the measles.
1759	- -	4,355	2,296	- -	1,079	Scarlet-fever showed itself epidemically for the first time, and carried off 1,000.
1760	- -	3,228	746	- -	118	Christian VII., then crown prince, inoculated. The inoculation hospitals closed for want of applicants.
1761	- -	2,593	123	- -	4	
1762	- -	4,512	2,223	- -	7	Measles and typhoid fevers prevailed.
1763	- -	5,034	2,707	- -	167	
1764	- -	3,675	1,028	- -	480	
1765	- -	2,973	432	- -	138	
1766	- -	3,923	1,286	- -	42	Dysentery prevailed.
1767	- -	3,361	404	- -	6	
1768	- -	2,912	- -	49	27	
1769	70,495	4,434	1,525	- -	1,219	First census taken.
1770	- -	3,770	860	- -	22	An inoculation establishment erected outside the city for 48 persons; 16 payers and 32 poor.
1771	- -	3,144	487	- -	8	
1772	- -	4,209	1,605	- -	22	Measles prevailed severely.
1773	- -	3,229	435	- -	190	
1774	- -	2,273	- -	647	116	
1775	- -	3,220	311	- -	276	
1776	- -	2,825	56	- -	86	
1777	- -	2,894	- -	292	7	Scarlet-fever very virulent.
1778	- -	2,884	- -	44	278	
1779	- -	3,159	138	- -	283	
1780	- -	2,673	- -	362	98	
1781	- -	3,741	756	- -	174	148 died of the measles, which prevailed this year.
1782	- -	4,122	1,422	- -	332	
1783	- -	2,917	- -	118	123	The inoculation establishment outside the town closed, and its property transferred to the lying-in hospital.
1784	- -	3,004	- -	220	77	
1785	- -	3,762	171	- -	427	
1786	- -	4,001	867	- -	193	Typhus. Small-pox epidemic at Elsinore. (See De Meza's Acta Med. Hav. vol. iii.)
1787	- -	3,484	419	- -	136	Scarlet fever prevailed.
1788	- -	3,733	675	- -	185	
1789	- -	3,849	670	- -	323	
1790	- -	2,313	- -	1,179	140	
1791	- -	3,649	290	- -	297	Measles.
1792	- -	2,645	- -	878	155	
1793	70,495	2,433	- -	851	139	
1794	- -	3,123	- -	146	452	
1795	- -	3,524	475	- -	248	Scarlet fever.
1796	83,604	3,045	18	- -	357	
1797	- -	3,278	2	- -	423	
1798	- -	3,717	366	- -	386	
1799	- -	3,601	194	- -	54	
1800	- -	3,689	308	- -	35	Scarlet fever.
1801	91,631	4,512	- -	1,357	486	Vaccination first introduced. A royal commission of vaccination appointed.
1802	- -	3,262	- -	353	73	Vaccination establishment erected at Copenhagen.
1803	- -	3,442	- -	237	5	The commission of vaccination recognize the protective powers of vaccination.
1804	- -	3,688	145	- -	13	
1805	- -	3,585	- -	265	5	
1806	- -	3,529	- -	361	5	
1807	- -	4,307	597	- -	2	Bombardment of Copenhagen by the English.
1808	- -	4,606	1,120	- -	46	
1809	- -	3,872	647	- -	5	
1810	- -	2,975	- -	810	4	Decree ordering vaccination was promulgated this year.
1811	100,975	3,604	154	- -	0	
1812	- -	3,410	101	- -	0	
1813	- -	3,764	493	- -	0	
1814	- -	3,711	458	- -	0	
1815	- -	3,409	216	- -	0	
1816	- -	2,956	- -	169	0	
1817	- -	2,907	- -	152	0	
1818	- -	2,554	- -	398	0	
1819	- -	2,319	- -	862	0	
1820	- -	2,576	- -	501	0	
1821	- -	3,459	- -	94	0	
1822	- -	3,345	- -	842	0	
1823	- -	2,852	- -	542	0	
1824	- -	3,212	- -	515	41	
1825	- -	3,280	- -	260	12	The vaccination commission abolished, and vaccination placed under the control of the board of health.
1826	- -	3,588	- -	9	29	
1827	- -	3,410	30	- -	4	
1828	- -	3,547	- -	487	1	
1829	- -	3,890	431	- -	29	Small-pox epidemic.
1830	- -	3,794	449	- -	3	
1831	- -	3,678	86	- -	0	
1832	- -	3,389	- -	18	3	
1833	- -	3,741	- -	146	19	Re-vaccination becomes general in May month. Quarantine for small-pox abolished.
1834	119,292	3,293	- -	335	26	
1835	- -	3,862	6	- -	434	
1836	119,591	2,848	-	789	81	Re-vaccination ordered for the army.
1837	- -	3,369	- -	234	1	
1838	- -	3,462	- -	97	2	
1839	- -	3,108	- -	513	0	
1840	- -	3,054	- -	487	2	
1841	- -	3,327	- -	119	0	
1842	- -	3,404	- -	207	35	
1843	- -	3,498	- -	263	111	
1844	- -	3,622	- -	373	83	Re-vaccination ordered for the navy.
1845	126,787	3,515	- -	625	7	
1846	- -	4,126	92	- -	0	
1847	- -	3,642	- -	468	0	
1848	- -	3,521	- -	941	2	
1849	- -	4,044	- -	213	7	
1850	129,695	3,563	- -	1,083	0	

Until 1803 the mortality is stated according to Callisen (see his Physical and Medical Observations on Copenhagen); until 1820, according to the statistical returns; after 1820 and till 1850, according to the tables of mortality drawn up by the police; and afterwards, by the city physician, and transmitted to the Board of Health. There is a not inconsiderable discrepancy, particularly in earlier years, between these tables and the lists drawn up by the church authorities, on which the details of the statistical tables in a great measure are based.

2. DUCHIES OF HOLSTEIN AND LAUENBURG.

In reply to the first question—

"Does experience prove that any great majority of successfully vaccinated persons have escaped the "small-pox, and that they have almost completely been protected from the fatal effects of this disease?"

Vaccination has been practised in the Duchy of Holstein since the commencement of the present century, but has only been made compulsory by Government since 1811. From that time, nevertheless, till within the last years, some sporadical cases have occurred in the rural districts, whereas the disease has assumed a more virulent character in populous places, such as Kiel, Rendsburg, &c., where the mortality of the infected amounted to from 7 to 12 per cent. From a minute investigation of the facts of the case it appears—and the Holsteinic Board of Health concur in the same view—that it would be premature, in the absence of any further evidence than these experimental trials, to answer the question in the negative.

It has been found that the small-pox disease during times of epidemic has almost always been introduced by contagion, either of persons or infected objects, and then mostly spread by contagion, and that there is at such periods a certain predisposition to such disease. Although it is a well established fact that individuals vaccinated, as well as unvaccinated, have taken the disease, yet there is a material difference in the course of the disease and its effects, inasmuch as the vaccinated, almost without exception, catch the disease in the modified form of milder small-pox, while the mortality of the unvaccinated shows a much more fatal result. In the year 1852–3, for instance, there were in the hospital at Kiel 218 patients suffering from the disease, out of which 152 were vaccinated and 66 not vaccinated; and while the disease swept away 21 (about 32 per cent.) of the latter, only 9 (6 per cent.) of the former fell victims to it. Now, taking into consideration that out of the nine cases of death among those vaccinated eight were not the effects of the small-pox solely, but arose also from a complication with other diseases, such as tubercular disease in the kidneys, dyscrasie from heavy drinking, and typhus, the causes of death of the vaccinated and unvaccinated individuals will be in a proportion of 32 to 72. The protection which vaccination affords from the fatal effects of small-pox seems thus, from the above numbers, to be established beyond a doubt.

The fact that even vaccinated persons may in some cases be infected with the genuine, and not the modified small-pox, loses much of its importance by a circumstance which experience has demonstrated does not admit of any contradiction, namely, that even individuals who have gone through the genuine small-pox, and who bear the marks unmistakeably upon them, may catch the disease de novo.

It seems thus that not merely the small-pox disease but also vaccination, in the course of time, lose their anti-variolous powers. The physicians of Holstein have not arrived at any unanimous conviction as to its durability. The prevailing opinion of physicians on the subject is, that vaccination loses its protective powers after a lapse of from ten to fifteen years, more especially if the different stages of puberty should fall within such periods.

The first question must therefore be answered in the affirmative as far as experience goes in the Duchy of Holstein.

During the epidemic of 1841 in the Duchy of Lauenburg more than 100 individuals took the disease; and of these 3, who had not been vaccinated, all died; while out of those who had gone through that operation only 1 died, as far as could be ascertained, and this individual had, moreover, been sickly for a long time previous.

In reply to the second question—

"Does experience furnish any grounds for supposing that vaccinated persons, whilst less susceptible of "small-pox, are more exposed to typhoid fevers or other diseases, for instance, scrofula or consumption; "or that vaccination has exercised any noxious influence upon the state of their health?"

In the absence of statistical information on this subject the solution of this question can only be sought for in data which experience has brought to light. There is, however, a general conviction that no connection is traceable of the vaccine with the above diseases, and that no increase of the latter has taken place consequent upon the introduction of the former.

In reply to the third question—

"Does experience afford any reason for assuming that syphilitic, scrofulous, or other infectious diseases "can be transferred to the vaccinated person through the lymph taken from one of Jenner's genuine "vesicles, or that any medical man of standing, with the object of vaccinating, can inoculate any "other disease without his knowledge?"

This question must be answered in the negative, as the experience which has been gained in the Duchies of Holstein and Lauenburg does not furnish sufficient grounds for answering it otherwise.

It must be observed that if importance be attached to the expressions in the question, "Jenner's genuine vesicles," and "medical practitioner of standing," the question must be answered unconditionally in the negative.

The observation which has been made by experienced medical men that cutaneous eruptions, pustules, and other symptoms of scrofula on the head or in other part of the body, and which generally make their appearance after vaccination, must be considered as evidence to the contrary, cannot be admitted by the Board of Health, as, on the one hand, there has always been some symptoms of dyscrasie in all such cases, and, on the other hand, the sudden appearance of scrofulous symptoms in fever, and more especially exanthematous fevers, is no rare occurrence.

Taken from this point of view we are warranted in asserting that the above-mentioned acute and febrile diseases do not afford sufficient proof of the origin of scrofula in the above-mentioned cases; whereas it is more likely that they have formed a germ by which a latent and concealed indisposition has been developed, and the outward symptoms of the disease been produced.

In reply to the fourth question—

> " Does experience warrant us, independently of special grounds in certain cases, in recommending the " practice of vaccination as a general measure ? "

This question has been decided in the affirmative, as being based upon the results of experience, which we have explained in replying to the preceding three questions. The country physician for the Duchy of Lauenburg makes the observation, that it is only by early vaccination that the numbers of the unvaccinated can be kept so low that the latter, in cases of small-pox epidemics, may be protected by vaccination, and further bounds be set to the spread of the disease. Medical men of experience and practice, who have had an opportunity of watching the operation upon the general state of health, have, without any exception, come to the conclusion that general vaccination at an early period ought to be strongly recommended, and that the attempts which have lately been made in various quarters to represent it as useless and even dangerous ought to be counteracted for the sake of science and humanity.

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3. EXTRACT from an EXPLANATORY PAPER accompanying the OFFICIAL ANSWERS from DENMARK.

THERE can be no doubt that the small-pox was known in Denmark at an early period of the middle ages, and probably even previous to that time, although the history of this or any other country makes no mention of its first appearance. One thing, however, is certain, and that is, that Denmark, like other countries, suffered through a long succession of years, and especially during the century on which the question now turns (the 18th), from the dreadful ravages of this disease, and that she has, in a full measure, borne her share in the 45,000,000 who fell victims to the scourge; this being the number of lives, it is calculated, which Europe lost from the disease in the course of one century only, out of 160,000,000.

The population of Denmark was in	1769	-	-	814,238
" " "	1801	-	-	925,680
" " "	1834	-	-	1,223,797
" " "	1840	-	-	1,283,027
" " "	1845	-	-	1,350,327
" " "	1850	-	-	1,407,747

Of great epidemics, in Denmark, history mentions:—that of 1592 (see History of Christian IV., by Stange, vol. i. p. 62); that of 1656 (described by Th. Bartholin, in Cista Medica, p. 590); that of 1716 (see Botticher's Morborum Malignorum Descriptio, p. 19); and perhaps several others; but we search in vain for statistical returns exhibiting the number of individuals cut off by these epidemics. The disease raged year by year in the towns as well as in the country, and although it attained a frightful height every fourth and seventh year, attended with typhoid fevers, scarlet fever, and especially measles, yet our annalists did not feel themselves called upon to make any returns of an occurrence so common as this; the merits of the science of statistics, as applied to sanitary purposes, were at that time too little appreciated. In the face of such melancholy considerations it is satisfactory to be enabled to report that this disease, since the universal introduction of vaccination (1810), has not only lost its worst sting, but that the disease has not shewn itself in Denmark for more than 15 years. In the years 1824 and 1834, and in the years following and preceding these periods, small-pox appeared in the provinces as well as in Copenhagen, but it was not of a nature to excite any uneasiness.

The annals of Iceland report that small-pox raged in that country:—(1) in the years 1241 and 1242; (2) in 1257 and 1258 (very severely, carrying off several thousand individuals); (3) in 1291 (likewise); (4) in 1310–11 (1,600 are said to have died of the disease); (5) in 1347–48 (very severely); (6) in 1379–80; (7) in 1430–32 (very severely, the loss of lives is stated to have reached 8,000); (8) in 1462–63 (about 1,600 died); (9) in 1472 (not very fatally); (10) in 1511 (very severely); (11) in 1555–56 (very severely, 2,650 are said to have perished); (12) in 1574 (likewise severely); (13) in 1590–91 (700 died); (14) in 1616 (the disease was brought by an English vessel, raged severely, and carried off several thousand individuals); (15) in 1635–36 (somewhat milder in form than the last); (16) in 1655 and 1658 (brought by an English vessel to Westfjord); (17) in 1670 and 1672 (tolerably mild); (18) in 1707 (the great epidemic: the disease is said to have been brought into the country by some wearing apparel belonging to an Icelandic student who fled from Copenhagen for fear of the small-pox, took that disease on board the vessel, died and was buried in Norway (see Stephensen's Iceland in the 18th Century). Of the then population of Iceland, somewhat exceeding 50,000, this disease carried off, according to reports, 18,000. In that country where the parishes are so thinly populated, there were churches in the churchyards of which 30, 34, to 40 individuals were interred in one day. It was no unusual occurrence that persons having once gone through the disease and bearing the marks upon them, were attacked again and died. (19) in 1785, 86, and 87 (1,425 died); this was the last time the disease occurred in that island during the last century.

Since the introduction of vaccination small-pox has only once occurred in Iceland, namely, in 1839, when it was brought to the northern division of the island. It was very mild, and was prevented from spreading to the southern division by measures of isolation. Several individuals were seized with the disease who had had it in 1785. Of the population of the town of Reikavick and its environs, amounting to from 1,200 to 1,300, of whom the greater part were vaccinated, only 15 died. At a fishing cove, however, where only a few had been vaccinated, 40 died out of a population of about 600. The disease continued to prevail in 1840. The population of Iceland which, in the 12th and 13th centuries, is said to have been 120,000, was 46,201 in 1769, and 57,094 in 1840.

Small-pox was first brought to Greenland in the year 1734 by a vessel from Denmark. Nearly two thirds of the whole population of that country (which at that time was from 6,000 to 7,000) were swept away by this disease. Of 200 families living within a circle of from two to three miles from the Danish settlement into which the small-pox was brought, not 30 remained alive. Since the introduction of vaccination no fresh cases have occurred in that part of the realm.

The Board of Health, being unable to furnish any details as to small-pox and its mortality in the kingdom outside of the capital, as well as in the colonies of Iceland and Greenland, hopes to give more satisfactory information in respect of Copenhagen. This it has embodied in the annexed lists, extending over a period of 100 years (from 1751 to 1850), and exhibiting the fluctuations of the population, the annual mortality, the proportion of deaths to births, the number of individuals that have annually died of small-pox, the prevalence of other kinds of disease at such periods, and the adoption of measures calculated to exercise any influence upon the greater or lesser severity of the small-pox.

The immense number of lives which Denmark had lost from small-pox; the little confidence reposed by the people in the system of inoculation introduced into Denmark in 1754, despite of all the exertions of the Government and private individuals, and although it evidently diminished the severity of disease, and many had escaped it—Callisen states that, out of 900 whom he inoculated, none died—the trifling influence which this method generally exercised upon the mortality, coupled with the objection which might with propriety be raised against it, namely, that it retained the contagion; all these circumstances naturally combined to direct public attention to the discovery of Jenner in 1798, that vaccination with cow-pox protected the human body from small-pox, and the news was received with enthusiasm in the capital. Herholdt, Scheil, E. Viborg, and Rafn endeavoured to disseminate a knowledge of this discovery by written notices, and thirty-four of the most respectable physicians of Copenhagen formed themselves into a society to collect and investigate all grounds and arguments in favour and in disfavour of this anti-variolous agent as proposed by Jenner. A commission composed of medical men (Claskow, Guldbrand, Callisen, Winslov, and Viborg) was at the same time appointed by the Government, having the same object in view, and being instructed to recommend the adoption of means calculated to further a case of so much importance as this. After the lapse of but few years the private commission, as well as that appointed by the Government, although many of the members had from the commencement entertained a doubt as to the doctrine of Jenner, arrived unanimously at the firm and irrefutable conviction that vaccine virus was a preservative from small-pox. Through the perseverance and zeal of the Royal Commission vaccination was speedily introduced into all the provinces of Denmark, and the practice ordained by legal enactments, so that Denmark certainly deserves the encomium of having in this respect taken precedence of all other countries.

The district physicians and the country physicians (in Copenhagen, the city physician) are charged with the superintendence of the gradual progress of vaccination, under the control of the Board of Health, to which all returns on vaccination are to be transmitted. Denmark Proper is divided into nine sanitary districts, having 71 district physicians, besides seven town physicians. At Copenhagen a vaccination establishment has been erected, in which any applicant may be gratuitously vaccinated. The district physician makes an annual circuit in his district for the purpose of vaccinating in the towns such persons as may choose to apply. In travelling they make arrangements so as to return to each town on the day on which they may judge of the success of the vaccination. The physician has free conveyance on such circuits, and receives 24/ (*i. e.* 7*d.*) for every individual successfully vaccinated, which expenses are paid by the district. With the view of consantly preserving the lymph fresh the district physicians are permitted to request the attendance of children living in their district and receiving public instruction, training, or succour. The vaccinators are bound to dteliver to every person who has successfully gone through vaccination a certificate according to a certain form and to inscribe the names of those whose vaccination is found to be genuine in a register authorized for that purpose. None can be admitted into any educationary establishment (with the exception, however of ragged schools), nor be bound apprentice to any trade or profession, nor be received as an inmate into any of the establishments for the poor, nor receive relief therefrom, nor be married or admitted to confirmation, unless he or she has been vaccinated or has had the small-pox. Soldiers and sailors belonging to the navy are subject to the same regulation. Should any contagion make its appearance in the villages, every person living in such village and who has not been vaccinated nor had the small-pox shall, without exception, submit to vaccination. In respect of the towns, this enactment is confined to the inmates of that or those houses in which the contagion shows itself. All inoculation with small-pox is strictly prohibited. Since 1820 permission to vaccinate must not be granted to any but medical men, with the exception of Iceland, the Feröe Islands, and Greenland, where the local circumstances are of such a nature as to necessitate the practice by non-medical men.

In Iceland, which has one country physician and eight district physicians, it is enacted that every clergyman, after having received the necessary instruction of the country or district physician, shall be vaccinator ex officio in his parish, and keep a register of those vaccinated. Should his parish be very extensive, he may call in the aid of one or two efficient persons, known to the district physician, to act as assistant vaccinators. All matters bearing on vaccination are under the control of the district physician, whose duty it is to watch its progress, to provide for a proper supply of vaccine matter from Copenhagen in proper time, provided it cannot be collected on the spot; to receive the reports of the vaccinators, and to forward them to the country physician for transmission to the Board of Health at Copenhagen. The lower classes are strictly enjoined to appear for purposes of vaccination at such time and at such place as the vaccinator of the district may decide upon. The expense of vaccination, and especially the payment of 12/ (4½*d.*) for each individual successfully vaccinated, inclusive of the certificate, are paid out of the public purse.

The operation which these measures have had on the extension of vaccination, may be gathered from the following lists, shewing the number of those vaccinated in the Kingdom and in Iceland from 1802, till 1850.

THE KINGDOM.

Year.	Number of those Vaccinated.	Births.	Year.	Number of those Vaccinated.	Births.	Year.	Number of those Vaccinated.	Births.	Year.	Number of those Vaccinated.	Births.
1802	4,570	31,575	1815	24,300	35,861	1827	28,419	36,954	1839	23,909	38,722
1803	7,600	32,617	1816	26,755	32,225	1828	24,876	38,794	1840	–	41,033
1804	4,609	32,091	1817	26,385	32,553	1829	25,030	37,808	1841	–	–
1805	16,304	32,901	1818	27,910	32,255	1830	31,075	37,204	1842	27,866	41,295
1806	14,989	30,610	1819	26,095	32,377	1831	–	38,432	1843	31,008	41,386
1807	5,227	31,734	1820	28,544	36,653	1832	–	34,947	1844	30,238	42,586
1808	25,421	31,487	1821	21,193	32,714	1833	–	41,105	1845	32,330	43,425
1809	8,012	30,324	1822	28,962	34,755	1834	–	42,425	1846	31,843	43,000
1810	32,050	31,566	1823	29,439	34,599	1835	–	41,032	1847	30,330	44,153
1811	26,170	31,978	1824	38,334	33,723	1836	–	39,751	1848	29,073	44,703
1812	21,808	31,269	1825	39,279	34,249	1837	–	39,485	1849	30,937	45,637
1813	21,251	30,686	1826	28,775	39,826	1838	25,000	39,509	1850	–	–
1814	21,406	32,035									

ICELAND.

Year.	Number of those Vaccinated.	Births.	Year.	Number of those Vaccinated.	Births.	Year.	Number of those Vaccinated.	Births.	Year.	Number of those Vaccinated	Births.
1804	1	–	1816	57	1,244	1828	571	2,081	1840	–	2,077
1805	15	–	1817	1,230	–	1829	452	2,268	1841	–	2,185
1806	402	–	1818	979	–	1830	1,266	2,434	1842	278	2,169
1807	130	–	1819	474	1,326	1831	–	2,609	1843	110	2,066
1808	–	–	1820	635	1,369	1832	–	2,516	1844	406	1,983
1809	–	–	1821	301	1,629	1833	–	–	1845	749	2,107
1810	38	–	1822	125	1,667	1834	–	2,552	1846	–	2,163‡
1811	129	–	1823	–	–	1835	–	2,138	1847	–	1,978
1812	–	–	1824	–	–	1836	–	2,333	1848	652	2,193§
1813	630	–	1825	2,133	–	1837	–	1,952	1849	1,214	2,217
1814			1826	1,528	–	1838	481	1,911*	1850	–	–
1815	–	915	1827	635	1,888	1839	1,451	1,899†			

* 647 were vaccinated.

† 1,891 were vaccinated.

‡ Vaccination could not be practised on account of prevailing diseases, especially measles. In 1846 the deaths exceeded the births by 1,166.

§ The Report on Vaccination is not complete.

Upon a comparison of the number vaccinated in the Kingdom with that of the births, it appears that the provisions relating to vaccination are carried into effect tolerably efficiently, for if we deduct from the births those born in the Sleswick districts in Jutland—the returns of which are transmitted to Kiel—the not inconsiderable number of still-born children, and the still more considerable number of children that die before they attain the proper age for being vaccinated, and if we further add the number of those omitted in consequence of the non-transmission of the returns (sometimes for entire provinces), the difference will not be great.

The small-pox epidemics of 1824 and 1835 tended to prove that vaccination afforded immunity from small-pox only for a limited time, and re-vaccination became therefore general among the enlightened classes. The Government has since ordained that all soldiers, as well as sailors belonging to the navy, shall undergo re-vaccination, and that the same rule shall extend to all sailors proceeding to Greenland in the trading vessels of the Royal Greenlandic Society, and to all children in schools under the superintendence of the Poor Law Guardians, previous to their leaving school for the purpose of being confirmed.

ENGLAND.

1. ARMY MEDICAL DEPARTMENT.

I. In answer to the question, "Have you any doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of small-pox, and almost absolute security against death by that disease?"—I have no doubt.

II. In answer to the question, "Have you any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of any other infective disease, or of phthisis, or that their health is in any other way disadvantageously affected?"—I have not.

III. In answer to the question, "Have you any reason to believe or suspect that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?"—I have no reason to believe or suspect these.

In answer to the question, "Do you (assuming due provisions to exist for a skilful performance of the operation) recommend that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?"—I do recommend its being performed; in fact, I exact it, and in doing so, I only follow the practice which has been observed in the army for the last forty years at least. Further, I have every reason to believe, that any medical officer who might observe bad consequences to result from the practice of vaccination would report such; therefore, as no reports of the kind have, to my knowledge, reached this office, I assume that no grounds to warrant them have occurred.

A. SMITH, Director General.

2. NAVY MEDICAL DEPARTMENT.

No allusion is made in any of the medical reports of the surgeons of the navy, that vaccinated persons are more liable than others to any form of cutaneous disease, diseases of the skin being strikingly less common in seamen of the navy than in most other classes of men. Typhoid fever, too, is now comparatively rare in the navy, even in men on the home station, where they are frequently exposed to contagion in the houses of the lowest class of the population, in our large sea-ports, with which they have constant intercourse; the average mortality of typhus being less than one annually in every 2,000 men. Vaccination is frequently performed in the navy and at the navy hospitals, but I have never known or heard of its being followed by eruptive or other diseases. I have no evidence or suspicion that in certain cases vaccination conveys from person to person the specific infection of syphilis; but if such cases had ever occurred in the navy, I feel sure that they would have been reported.

J. LIDDELL, Director General.

3. NATIONAL VACCINE ESTABLISHMENT.

I. In answer to the question, "Has the experience of the National Vaccine Establishment given any reason to doubt that successful vaccination confers on persons subject to its influence a very large exemption from attacks of small-pox, and almost absolute security against death by that disease?"—None whatever.

II. In answer to the question, "Has the experience of the National Vaccine Establishment given any reason to believe or suspect that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of typhoid fever, or of any infective disease, or of scrofula and phthisis, or that their health is in any other way disadvantageously affected?"—Certainly not.

III. In answer to the question, "Has the experience of the National Vaccine Establishment given any reason to believe or suspect that lymph, from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection to the vaccinated person, or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?"—No. It has come to the knowledge of the Board that about eight years ago a very respectable medical practitioner (whose name and address we possess) called at one of the stations and requested to have several of his lancets charged with recent lymph. His wish was complied with, but most unfortunately, one of his own lancets thus charged was used in vaccinating some children, and produced considerable constitutional derangement. The lancet so employed was proved and allowed by the practitioner to have been used for other purposes, and to have been unclean.

IV. In answer to the question, "Does the experience of the National Vaccine Establishment justify a recommendation that, except for special reasons in individual cases, vaccination should be universally performed at early periods of life?"—Yes.*

CLEMENT HUE, M.D., Registrar.

RECENT PUBLIC VACCINATIONS of the NATIONAL VACCINE ESTABLISHMENT.

Stations at which Vaccinators are employed by the National Vaccine Establishment.	Average Annual Number of Vaccinations performed at each Station.		Average Annual Number of Charges of Lymph supplied from each Station.	
	During the Three Years 1850–2.	During the Three Years 1854–6.	During the Three Years 1850–2.	During the Three Years 1854–6.
8, Russell Place, Fitzroy Square	1,507	1,149	44,690	36,704
49, Praed Street, Paddington	222	131	5,298	5,586
Commercial Road East	581	365	45,302	35,279
Caledonia Place, King's Cross	364	278	7,536	7,147
219, Shoreditch	*156	142	7,025	4,547
25, Charles Street, Westminster	80	76	2,290	4,003
14, Oxford Terrace, Chelsea	29	43	1,000	2,850
50, Gloucester Place, Portman Square	1,129	1,039	12,687	13,323
7, Spital Square	370	286	9,401	11,381
38, St. George's Road, Pimlico	846	160	15,310	4,882
1, Trinidad Place, Islington	*113	112	7,118	7,087
Surrey Chapel, Blackfriars' Road	2,918	2,660	32,682	48,057
Grange Road, Bermondsey	763	547	5,035	7,068
5, York Row, Kennington	111	94	1,537	1,790
68, Dean Street, Soho	316	236	4,721	15,632
1, Well Street, Wellclose Square	752	538	5,170	5,463
101, Dorset Street, Fleet Street	456	351	4,602	9,494
	10,713	8,207	211,404	220,293

* Appointed December, 1851.

(Signed) J. NEWTON TOMKINS,
Inspector of Vaccinators to the National Vaccine Establishment.

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4. MEMORIAL presented in 1855 to Sir BENJAMIN HALL, then President of the Board of Health, by the President and Council of the Epidemiological Society, on a proper State Provision for the PREVENTION of SMALL-POX and the EXTENSION of VACCINATION.

1. THE prevention of disease being the great function of the Board of Health, and the diseases preventible by public measures being chiefly of the epidemic and endemic classes, it is to the alleviation or suppression of these that the attention of the Board will naturally be first directed.

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* The answers to the above questions are formed from the experience of the Board during the last half century, since its first establishment, and the documents in which such opinions are recorded consist of Reports of the National Vaccination Establishment, annually transmitted to the Home Department.

2. Amongst them it will be found that small-pox is still[*] one of the most fatal, destroying, on an average in London alone, nearly 1,000 persons every year, and in England and Wales little short of 8,000; whilst in particular years of epidemic aggravation the mortality is still more formidable.

3. Yet small-pox is the most preventible of diseases, differing from all other epidemic diseases in this remarkable respect, that while these latter can only be prevented by discovering and remedying the various conditions (as of crowding, want of drainage, filth, and the like) which give rise to or assist in the dissemination of the specific poison of each disease, the former may be guarded against and prevented by a direct prophylactic measure. To small-pox, in short, there is an antidote. The same cannot be affirmed, in the present state of our knowledge, of any other epidemic disease.

4. That antidote is vaccination. In exact proportion as this has been efficiently practised have the extent and severity of small-pox been diminished over the surface of the world; to the neglect of it, or to its inefficient performance, is due the still large existing mortality in this country,—a mortality in striking contrast to that which obtains in some other countries, in which more adequate provision is made for the vaccination of the people.[†] While out of 1,000 deaths from all causes, there are in England and Wales, 21 from small-pox, and in some parts of Ireland upwards of 50,—in Sweden, Bohemia, and some of the Italian states there are not more than two.

5. The Small-pox and Vaccination Committee of the Epidemiological Society, in a "Report on the state of Small-pox and Vaccination in England and Wales, and in other Countries," of which a copy is herewith enclosed, have thoroughly investigated the methods pursued in various countries of Europe for the vaccination of the people, with their results; and have arrived at the conclusion that two things are essential to the thorough vaccination of any population; videlicet:

1st.—That it be made a matter of legal obligation.
2d.—That there be added administrative science, zeal, and activity.

6. The union of both these conditions is indispensable;[‡] either of them, without the other, will fail.

7. Until very recently, neither of these conditions existed in this country. Vaccination was entirely a matter of individual concern. The recognition of the value of the practice, which the State had given in the foundation (in 1809) of the National Vaccine Establishment, went only to the extent of providing for the maintenance and diffusion of supplies of pure lymph. This was the great object of that institution, and it is an object which has been admirably fulfilled. The National Vaccine Establishment was never intended for, and its machinery is not adapted to the vaccination of the population at large; and it cannot be too often repeated, that it is in no degree responsible for the present condition of vaccination in this country. It was not till 1840 that any general provision whatever was made for the vaccination of the people. By an Act passed in that year, public parochial vaccinators were for the first time appointed. They were appointed (as they still are) under contracts with boards of guardians, and they are paid, like the union medical officers, partly from the Consolidated Fund, and partly from poor's rates. Their prescribed duty was to vaccinate all persons resident within their respective unions or parishes who applied to them for the purpose. It did not go further than this; and it must be added, that the contracts made were, in a large proportion of cases, of such a kind as to offer little inducement to individual medical men to exert themselves for the diffusion of vaccination. The Act, however, gave undoubtedly an impulse to vaccination, and the mortality from small-pox diminished. Still in the tenth year of its operation, the deaths from this cause in London alone were upwards of 1,000; and in 1853 the Legislature determined to take a further step, and a most important Act was passed, rendering compulsory the vaccination of all children born in England and Wales subsequent to the 1st of August in that year. Thus, one of the two grand requisites pointed out for the vaccination of the people, videlicet, the rendering it a matter of legal obligation, was at length adopted, but not, as we shall immediately proceed to show, to the full extent required; while no provision whatever was made for the application of that administrative science, zeal, and activity, which, it has been already stated, are equally essential with a legislative enactment for the attainment of the object desired.

8. The results, notwithstanding, have been of the most encouraging kind, and such as to demonstrate, in a striking manner, the extreme necessity for, and value of, the compulsory Act. By a return, for which the council of this society are indebted to the courtesy of the Poor Law Board, it appears that in the first year of its operation, the number of public vaccinations of children under one year of age has been more than doubled, having increased from 201,291 in 1853 to 408,824 in 1854. As compared with the births registered in each of these two years, the increase has been from 33 to 65 per cent. But while such improvement cannot be mentioned without feelings of the most lively satisfaction, it is much more important to fix attention on the better results which might be attained under a more perfect system of administration from a measure intended to apply, not to 65 per cent. of the births only, but to every child born. A certain

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[*] Report on the State of Small-pox and Vaccination in England and Wales, &c., p. 33 and p. 40.

[†] Report, pp. 9, 10.

[‡] Report, pp. 7–11. In addition to the proofs afforded in the published Report that the value of compulsory enactments depends much on administrative arrangements and energy, we may remark that in Austria, where there are stringent laws for vaccination (vide Report, p. 86), the police having even the power to take hold of any non-vaccinated person, and compel him then to submit to the operation, there are yet many cases every year of small-pox in unvaccinated persons. Numerous cases of this kind were admitted into the Vienna Clinique for Skin Diseases, in 1852 (see Vienna Zeitschrift der K. K., &c.) The same is the case in Prussia.

deduction, indeed, must always be made for the numbers vaccinated by private practitioners, and by public institutions unconnected with the public parochial system. There are no data for exactly estimating the proportion of these, and it probably varies considerably in different parts of the kingdom. But taking the country throughout, there is reason to believe that not more than from 10 to 15 per cent. of the children born are so vaccinated; for it is found that in unions in which particular care is bestowed upon the public vaccinations, the number of these is from 85 to 90 per cent. of the births. If we estimate 80 per cent. only, as the number requiring to be provided for by the public vaccinators, the results of last year fall short of those which should be attained by nearly 100,000.

9. The still existing deficiencies will be made most obvious by taking a few examples of particular unions. Thus, in the Liverpool Union, the births registered were 9,150, but the vaccinations under one year of age only 5,268; in the Newport Union, Monmouthshire, for 1,585 births, there were only 634 vaccinations; in the Greenwich Union, 3,599 births, 1,922 vaccinations; in the Lambeth Union, 5,221 births, 2,194 vaccinations; in the Hastings Union, 673 births, 298 vaccinations; in the Richmond Union, in the North Riding of Yorkshire, 406 births, 210 vaccinations, &c., &c. The district registrars also, in various parts of the kingdom, have reported to the Registrar General the prevalence of small-pox in their respective districts from neglect of vaccination; and in the metropolis (in which, as may be seen by the examples of the Greenwich and Lambeth Unions given above, the Act has been comparatively inoperative), the mortality from small-pox, in 1854, amounted to nearly 700, a number much higher than was observed in 1849 or 1850.

10. It is evident, then, that a great deal yet remains to be done to secure the thorough vaccination of the people, and the more effectual repression of small-pox; and the President and Council of the Epidemiological Society, deeply convinced of the importance of prompt measures to secure these most necessary objects, and believing that the changes required can only be satisfactorily carried out by the Government, through the agency of that department of it charged with the care of the public health, respectfully solicit the earnest attention of the President of the Board of Health to the following exposition of the deficiencies in the Compulsory Vaccination Act, and of the evils which attach to the present system of administering vaccination throughout the kingdom.

I.—DEFICIENCIES IN THE COMPULSORY ACT.

(A.) The compulsory Act applies only to children born in England and Wales after a certain date; it does not extend to the whole existing population of England and Wales, nor to those who, whether adults or children, may at any time immigrate into this portion of the kingdom. This is a grave defect. It is well known that small-pox is largely imported into this country, and kept up by immigrants from Ireland, and this to such an extent that it has been made a matter of complaint from towns in the north of England to the Poor Law Board. These Irish immigrants not only form a nidus for the disease in towns in which they collect in large numbers, as London, Liverpool, Glasgow, Bristol, &c., &c., but they disseminate it throughout the country, as at harvest time, and in the season of hopping.

(B.) The Act professes to punish disobedience by fine or imprisonment, yet there is no one specially charged with its execution; no public officer of any kind whose duty it is to proceed against offenders; a defect repeatedly alluded to by the district registrars throughout the country.*

(C.) The Act does not provide an efficient and workable system of registration, without which it is impossible to know how far it is carried out or not, and consequently to take steps which might be required to secure its more effectual working in any particular place. It is enacted, indeed, that every medical practitioner who has successfully vaccinated a child shall transmit to the registrar a duplicate certificate of the fact; but the returns of the registrars† from various parts of the country show that this portion of the Act is inoperative. When the circumstances are inquired into, it generally turns out that the vaccination has been performed, and that a certificate to that effect has been given to the parents, but that the public certificate is withheld. And this result can hardly be considered surprising when we reflect on the injustice, as well as impolicy, of arbitrarily requiring professional services from medical men, without any corresponding acknowledgment; an injustice the more conspicuous in the present instance, as provision is expressly made in the Act for the remuneration of the registrars for the extra services required of them under its provisions.

II.—DEFECTS IN THE SYSTEM OF ADMINISTRATION.

The administration of public vaccination in England and Wales is carried out, under the direction of the Poor Law Board, by medical men, who hold their office as public vaccinators by contracts with the board of guardians of their respective unions. The vaccinators keep two registers, one in which the names of all children vaccinated are entered at the time the operation is performed, the other in which the same names are re-entered at the end of a week, with a column showing the results of the vaccination. These registers are laid before the boards of guardians at their ordinary meetings, and the numbers

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* Registrar General's Quarterly Returns for 1854.

† Quarterly Returns, especially quarter ending 30th September 1854.

"vaccinated," and "successfully vaccinated," extracted by the clerk. A return of these numbers is annually made to the Poor Law Board from each union; it is the province of one of the clerks in the office to receive and arrange these returns, which form the foundation of the measures which the Poor Law Board may take to remedy any neglect which may be brought to light in particular unions. In commenting on this system, the working of which has been most fully analyzed in the Report of the Epidemiological Society (pages 19–29), and the results of which are seen in the continued high mortality from small-pox in various parts of the country, it must be distinctly understood that no blame whatever is imputed to the Poor Law Board, and their immediate officials; on the contrary, they have laboured with earnest and conscientious zeal in the discharge of the duties imposed upon them, and the errors to be pointed out reside entirely in the system itself.

(A.) It is manifest, in the first place, that the vaccination of the people, which is a measure undertaken by the State for the security of the public, has nothing in it of the character of alms, and does not fall properly under a department of government whose sole function is the distribution of alms, while it is equally obvious that it does fall naturally under a department charged with the maintenance of the public health. Had there been such a department in existence when vaccination was first made a matter of public concern, there can be no doubt that the duty would have been placed in their hands, and it is not only proper, but highly politic, that it should now be transferred to them. Vaccination, like many other great and beneficial discoveries, has had and still has prejudices to encounter, and it is of the last importance that it should be presented for public acceptance in the manner most calculated to soften and subdue these prejudices; but to stamp it with pauperism, or to give it even the semblance of an act of poor-law relief, is not to soften and to subdue, but to aggravate and add to prejudice, and this has unquestionably been the result (as has been repeatedly noticed by the Poor Law Board), and it has operated to retard the cause of vaccination.

(B.) The connexion of vaccination with the poor law has had another most injurious effect in deterring many medical men from becoming public vaccinators; their fear has been that, in accepting a contract with a board of guardians, they might render themselves liable to be looked upon in the light of parochial officers, rather than in that of merely public vaccinators; and this has been no hypothetical fear, as was proved on a recent flagrant occasion, when the public vaccinators of St. Pancras were instructed by the vestry, as of right, to assist the parochial medical officers in the treatment of cases of cholera, and when one of them, who was unable or unwilling to comply with this arbitrary command, was held up to public obloquy and threatened with dismissal from his office. In other instances, an evil of the reverse kind has obtained, and where men of character and standing would have been willing to contract, boards of guardians have thought proper to limit the contracts to the union medical officers. The result of the whole has been to render these officers almost exclusively the public vaccinators of the kingdom. In dealing with this important but difficult topic, the council of the Epidemiological Society are particularly desirous not to be misunderstood. The character and capability of the present public vaccinators are beyond all dispute, and they would not think for a moment of recommending interference with any existing contract; but it is obviously not desirable that the public arrangements should put any obstacle in the way of the employment of any competent medical practioner, willing to undertake this great public duty; on the contrary, there is no way by which the people will be more surely attracted to vaccination, than by their being able to select the practitioner by whom they would desire it to be performed.

(C.) The present system has been faulty in this respect, that the provisions for the remuneration of public vaccinators have not been such as to secure their hearty and zealous co-operation. The most injurious consequences have undoubtedly resulted from this, both in limiting the numbers vaccinated and in discouraging the vaccinators from giving that pains and attention to watch the progress of the vaccine disease which are imperatively necessary, a point to which further allusion will be made hereafter.

(D.) But no compulsory enactment, however comprehensive and stringent; no alteration in the mode of appointing public vaccinators, however desirable; no additional remuneration and encouragement to them, however necessary, will be sufficient to secure the grand object to be had in view, the universal diffusion of vaccination and the extinction of small-pox, unless there be some competent and energetic medical officer to harmonize the whole system and keep it in constant activity; to examine continually its working, that what is defective may be immediately supplied, and, in cases in which it is required, to enforce the law, whether against those who refuse to submit to the vaccination, or against those who, by travelling about and improperly exposing themselves, notwithstanding the stringent penal enactments which exist to the contrary, diffuse small-pox throughout the kingdom. The necessity for the appointment of such an officer, as the keystone to any effective system, will be best demonstrated by a brief consideration of some of the more important duties which would devolve upon him.

(*a.*) It is presumed that he would be appointed by the Minister of Health; that his duties would be the superintendence of vaccination and the repression of small-pox; and that he would be a medical man thoroughly conversant with the subject, and of high standing, that he might command the respect of the profession.

(*b.*) It is presumed, also, that the contracts at present subsisting between the public vaccinators and their respective boards of guardians will have been transferred to the Minister of Health; that is to say, that the vaccinators will continue to discharge their functions as heretofore, subject, however, to the Board of Health, and no longer, in this respect, to the guardians or to the Poor Law Board.

(*c.*) It is presumed, further, that the Minister of Health will have been empowered to enter into contract with, or to appoint, any other qualified medical men desiring to hold the office of public vaccinators.

(*d.*) The first duty, then, of the superintendent would be, to see that in each union of the kingdom there are provided proper facilities for vaccination, whether as regards,

(a.) The number of public vaccinators.
(b.) The number and position of the vaccination stations.
(c.) The arrangement of days and hours for vaccinations.
(d.) The arrangements for the inspection of the vaccinated.
(e.) The supply of good and sufficient lymph.

And to take care that the public vaccinators are adequately remunerated.

(*e.*) He would next devise a form of register to be kept by each public vaccinator, simple and less troublesome than the present form, inasmuch as it would require only one entry to be made of each case, but which would show, more definitely than at present, the results of each operation. The names might be extracted from this register at stated times, and forwarded to the respective district registrars, and thus the cumbrous plan of a full duplicate certificate transmitted to the registrar in each separate case dispensed with.

(*f.*) He would organize a more just and efficient system for the registration of vaccinations which may have been performed by private practitioners.

(*g.*) He would at short* intervals (as every month or two months) receive the returns of the numbers vaccinated in each vaccination district, and would compare them with the register of births. He would thus have his attention immediately called to those places in the kingdom in which vaccination does not proceed *pari passu* with the increase of the population. The possibility of keeping small-pox altogether out of a district by thorough vaccination has been demonstrated in the report of the Epidemiological Society (pages 12 and 88), and it is only by such a step as that now suggested that it will even be possible to prevent epidemics of small-pox.

(*h.*) It would also be his special duty in like manner to see that proper provision was made for the vaccination of all unvaccinated immigrants, and he would endeavour eventually to secure such an extension of a good plan of vaccination to Scotland and Ireland as would abolish much of the risk now run by the inhabitants of other portions of the kingdom from persons immigrating thence.

(*i.*) His duties would not merely extend to the providing for the performance of the operation of vaccination, but to the seeing that it was carefully and efficiently done. The necessity for extreme care in the performance of vaccination, and of watching it through its various stages, to render it an efficient safeguard against small-pox—an original doctrine of Jenner—has been dwelt on by a large number of medical men throughout the kingdom, with whom the Epidemiological Society have been in correspondence on the subject, and fears expressed by them, that in many instances the necessary precautions have been unheeded.† These views are strongly corroborated by the researches of Mr. Marson at the Small-pox Hospital, who has shown not only that there is a great difference in the amount of protection offered by vaccination, according to the care with which the operation has been performed, but that the vaccinations in England, while equal, or even superior to those of France, have been far less efficaciously performed, on the whole, than those of Italy and Spain; still less than those of Germany, Sweden, Denmark, or Norway. The subject is one of extreme difficulty and importance, and quite impossible to be fully considered in a memorandum of this kind; but it forms manifestly one of the strongest arguments which can possibly be adduced for placing the superintendence of vaccination in the hands of persons fully competent to deal with such questions in all their bearings.

(*k.*) He would receive from the public vaccinators, and would solicit from the medical profession generally, a communication of all important facts observed with regard to the vaccine disease, and its protective power; and he would thus, from year to year, accumulate knowledge of an authentic kind, which would probably solve many still disputed questions. For example, as to the necessity of the renewal of the vaccine protection after a certain period of life; as to the continued activity of the original stock of lymph, and the like.

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* Report, pp. 27, 28; where the paramount importance of returns to a central superintendent at very short intervals is shown, and illustrations are given of the results arising from neglect of this.

† Mr. Godwin, of Norwich, writes :—" I have known surgeons, who do not limit themselves to any day or period for taking ichor, and on re-vaccinating children and young persons under these circumstances more than a moiety have proved susceptible of the genuine vaccine disease."

Mr. Pooley, of Cirencester :—" My experience leads me to believe that great carelessness exists on the part of many country practitioners as to the condition of the lymph when taken from the arm."

Mr. Jorden, of Belgrave subdistrict, St. George's, Hanover-square :—" I am sorry to say I find medical men are often careless and indifferent as to the age or state of the vaccine vesicle from which lymph is taken."

The above are given as illustrations; an immense number might be added to the same effect.

(*l.*) In concert with the National Vaccine Establishment he would see that the vaccinators were duly supplied with good and effective lymph.

(*m.*) In the repression of small-pox, his duty would be to communicate with, or, if necessary, to visit any locality in which this disease might make its appearance in the epidemic form; to inquire immediately into the whole circumstances of the case, and to put in force all measures which might be required to arrest the pestilence. The possibility of arresting epidemics (after they have set in) by prompt and vigorous measures has been abundantly shown, and a marked defect of the present system has been that it has not been such as to ensure either the promptness or the vigour necessary for the purpose; an efficient discharge of this duty, and of that imposed in paragraph (*g*), would go far towards the annihilation of the small-pox in this kingdom.

(*n.*) It would be his duty to put the law in force against persons improperly exposing themselves or their offspring before a sufficient time has elapsed after an attack of small-pox.

(*o.*) The results of each year would be embodied in a report, which would exhibit the state of small-pox and vaccination throughout the kingdom.

11. For the establishment, then, of a proper provision for vaccination, and the suppression of small-pox, the following changes appear to be indispensable:—That it be made a matter of legal obligation on all persons resident within England and Wales, whether born in that portion of the kingdom or not, to give evidence of being vaccinated; that a better system of registration be established; that the administration of public vaccinations be transferred from the Poor Law Board to the Board of Health; and that there be one or more medical superintendents under that Board, a general outline of whose duties has already been given. The fundamental changes being provided for by Act of Parliament, the details of administration would be directed by the Minister of Health, subject to the control of the Secretary of State.

12. The changes thus proposed have long been looked forward to by the President and Council of the Epidemiological Society as essential to a proper system of public vaccination. About a year ago, in a report on the amended bill of Lord Lyttleton, a copy of which was forwarded to the Secretary of State for the Home Department, while expressing their satisfaction that compulsory vaccination should be recognised by the Legislature, they dwelt on the administrative alterations required, and stated their conviction, "that the disconnection of public vaccination from the poor-law administration, and the placing it (as in other countries) under the superintendence of competent persons, whose sole duties should be the organising and carrying out a system for the entire vaccination of the people, would be found to be ultimately indispensable." They desire now to express further their opinion, that the time has arrived when this change should be effected, and that it ought to be carried out under the auspices of the Board of Health; and deeply concerned at the continued high mortality from small-pox in this country, they deem it a matter of imperative duty to urge upon the Minister of Health the propriety of at once conferring with the Secretary of State for the Home Department, and with the President of the Poor Law Board, with the view of framing some measure for carrying out the alterations suggested, during the present Session of Parliament.

FRANCE.

I. Si une vaccine qui a donné des boutons reguliers ne préserve pas toujours complètement de la variole, elle l'oblige du moins à se reduire, à s'adoucir, à se transformer en cette eruption particulière qui a reçu le nom de varioloïde.

La varioloïde est sans doute de même nature que la variole, mais elle n'en a ni la durée, ni la gravité: elle passe vite, et est presque toujours exempte de danger.

II. Il n'y a aucune bonne raison de croire que la vaccine, en prenant la place de la petite vérole, prépare l'economie à la fièvre typhoïde, ni aux scrophules, ni à aucune autre maladie.

La vaccine ne met aucun prix a ses bienfaits.

III. La vaccine ne transmet que la vaccine. On peut prendre le vaccin sur des sujets galeux, dartreux, scrophuleux, syphilisés, &c., il ne reproduit que la vaccine sans aucun mélange.

IV. Oui, le moment le plus opportun de pratiquer la vaccine c'est l'enfance. La raison en est évidente; la vaccine étant destinée à prendre la place de la petite vérole, il faut nécessairement que le préservatif précède le mal; or, quoi qu'elle soit de tous les âges, la petite vérole s'attache, cependant, de préférence aux enfants.

Toutes ces questions et beaucoup d'autres ont été traitées avec détail, dans les rapports que l'Académie de Médecine de France adresse tous les ans à l'autorité supérieure; et comme nous ne pouvons que nous répéter, nous prenons la liberté d'y renvoyer M. le Président du Département Sanitaire du Gouvernement de Sa Majesté Britannique. (Voir, entr'autres, les dix derniers rapports de 1849 à 1854.)

PORTUGAL.

I. In Portugal experience has proved that vaccination, even where most successful, does not give complete security against death by small-pox;—as well as that the exemption from attacks of small-pox resulting from the influence of vaccination is of longer or shorter duration in proportion to the greater or less activity and strength of the vaccine lymph. The prophylactic and preservative virtue of the vaccine seems to be in an inverse proportion to its age, that is to say, to the number of its transmissions.

If vaccination does not completely answer all the expectations raised by its glorious discovery, it is nevertheless certain that at least it preserves the greater number of persons who have been properly vaccinated from the small-pox, and considerably lessens its virulence in others.

II. Experience has not furnished facts which give sufficient grounds for concluding or suspecting that vaccinated persons are, on that account, more susceptible of typhoid fever, or of any other infective disease, or of scrofula, or of phthisis; or that in short their health is disadvantageously affected on account of their being vaccinated. On the contrary, there are some instances which lead to the belief that vaccination may be favourable to the dispersion of certain tumours of a scrofulous and erectile nature (*nævi materni*).

III. There are no ascertained instances which give any reason to believe or suspect that lymph from a true vaccine vesicle has been the vehicle of syphilitic, or scrofulous, or other constitutional infection to vaccinated persons. Nor is it ascertained that any medical practitioner, however unskilful, has produced the inoculation of another disease instead of the proposed vaccination.

IV. Experience has shown that vaccination may be successful both at early periods of life and in adult age. It appears, however, that the most favourable period of life for vaccination to be successful is from three to six months of age;—as well as that the vaccine lymph, *cæteris paribus*, when taken from children appears to be more active and sure in its effects than that taken from adults.

PRUSSIA.

I. Properly performed, successful vaccination is in most cases a protection against small-pox. This protection, however, lasts with certainty only for a number of years hitherto not precisely determined. Revaccination is therefore generally recommended; and, in case of an epidemic of small-pox, is even ordered as early as within two years of the period of a previous successful vaccination.

Vaccinated persons, if afterwards attacked by small-pox, are not in all instances secure against a fatal termination of the disease; for the course and issue of every feverish disease depends upon the concurrence of incalculable circumstances. There are even cases known of second attacks of true small-pox in which the second attack has proved fatal.

II. There is no reason to assume that vaccinated persons contract a greater susceptibility to typhoid fever and other infective epidemic diseases, or to scrofula and phthisis; but, on the other hand, it has been clearly established that in consequence of vaccination mortality has decreased.

The apparent extension of the above diseases is to be attributed to increase of population.

III. It is not to be assumed or apprehended that by vaccinating with clear lymph, taken from a true Jennerian vesicle between the seventh and ninth days of its development, the germ of syphilitic, scrofulous, or other constitutional diseases can be transferred and inoculated. Nor that a duly educated careful medical practitioner can by mistake use for further vaccination another product of disease from the vaccinated arm instead of lymph of the above-described quality.

The apprehension in question would arise if the medical practitioner should inoculate with the secretion of a pustule already in the stage of suppuration, or of one which had transformed itself into an ulcer.

IV. The results of vaccination, introduced by law into the Prussian States, justify the recommendation of general vaccination in the years of childhood. It is beyond a doubt, that, during the prevalence of small-pox epidemics, before the introduction of vaccination, children especially were either carried off, or incurred, as consequences of the disease, very serious injuries, which affected them through life, such as loss of sight or of hearing, disfiguring scars, &c.

For this reason, vaccination to be beneficial must be performed on children, particularly as the operation is borne without the least danger even in the first months of life. It is, however, indispensably necessary that every precaution for its correct performance should be taken, and that the reasons which in individual cases may exist against the operation should meet with proper consideration.

NOTE by DR. HOPPE, on the RE-VACCINATION of the PRUSSIAN Army.

IN consequence of the frequent and constantly recurring unequivocal experience, that individuals who in their youth had been successfully vaccinated were nevertheless at more advanced age attacked with small-pox, and in consequence of the increased frequency of cases of small-pox among the troops of this country, my predecessor in office was induced to recommend to the army-surgeons the practice of re-vaccinating the soldiers; and the result was, that re-vaccination, to a larger or smaller extent, took place with visible success in the year 1832 in many corps of the army.

Under the sanction of a Royal Order in Council of June 16, 1834, this proceeding was then passed into a law, entitled "Directions for guarding against the Small-pox in the Army," of which a copy is hereto annexed.

In obedience to these directions, all recruits who do not bear on their persons unmistakeable marks of small-pox, from which they have already recovered, or who cannot show by a certificate of vaccination that they have already been successfully re-vaccinated within two years of their entering the army, must, within the first six months after their joining the same, be re-vaccinated by the army-surgeon by at least ten punctures on each arm.

According to the above directions, the vaccine lymph requisite for re-vaccination ought, if possible, to be taken from youthful individuals vaccinated for the first time. More recent experience, however, has shown that inoculation with the lymph taken from genuine vaccine pustules of grown-up and re-vaccinated persons has a similar good effect; and consequently, the latter is almost universally employed by army-surgeons for re-vaccination.

The results of this re-vaccination in the Prussian army have been satisfactory in every respect; for while the proportion has hitherto progressively increased* of those in whom genuine cow-pox, regular in its course, has resulted from re-vaccination, the number of cases of small-pox in the army has continued to diminish.

The following is a statement of cases of small-pox in its different forms in the army, for the years to which it relates:—

Year.	Cases.	Deaths.	Year.	Cases.	Deaths.
1834	619	38	1838	111	7
1835	259	5	1839	89	2
1836	130	9	1840	74	2
1837	94	3	1855	12	—

Re-vaccination does not, indeed, as experience has already shown, act as an *absolute* protection against infection by small-pox, since cases still occur, though rarely, in which persons who had been vaccinated *with success* have been at an earlier or remoter period attacked by small-pox. The disease, however, then almost always manifests itself in a much milder form, and is of a much slighter and more favourable character.

RUSSIA.

NOTE from the RUSSIAN MINISTER to Lord WODEHOUSE, British Ambassador at St. Petersburg.

DÈS la réception de la note de Lord Wodehouse, &c., en date du $\frac{29\ \text{Octobre}}{10\ \text{Novembre}}$ 1856, le Ministère Imperial s'est empressé de demander au Dept. de Médecine, par l'entremise de M. le Ministre de l'Intérieur, les renseignemens que le Gouvt. Britannique a témoigné le désir d'obtenir sur certain points relatifs à la valeur hygiénique de la vaccine.

Le s.s. &c. a l'honneur d'informer M. le Ministre d'Angleterre, que le Conseil de Médecine a été chargé de recueillir ces renseignemens. Le s.s. tient cependant à prévenir Lord Wodehouse que les données dont il s'agit ne pourront être réunies avec autant de célérité que le Gouvt. Britannique semble le désirer: la grande étendue de l'empire ne permet pas d'achever en peu de temps les recherches que les autorités médicales se sont empressés d'ordonner pour satisfaire au vœu du Gouvt. Anglais.

Le s.s. profite, &c.

St. Petersbourg, le 3 April 1857. (Signé) J. TOLSTOY.

SWEDEN AND NORWAY.

1. SWEDEN.

I. EXPERIENCE has shown, in Sweden, that successful vaccination confers on persons subject to its influence a very large exemption from attacks of small-pox, at least for several years (the time to be fixed by further experience). In vaccinated persons affected by small-pox, its decursus (course) is in most cases modified, mild, and without danger to life and future health. In the relatively few cases where the opportunity (susceptibility) for small-pox continues totally unchecked by previous apparently successful vaccination, this operation of course does not confer security against death by that disease.

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* In the year 1833 it amounted to thirty-one, in the year 1855 (on the contrary) to sixty-three, per cent.

II. The experience of Sweden has given no reason whatever for the belief or suspicion that vaccinated persons, in being rendered less susceptible of small-pox, become more susceptible of typhoid fever, or of any other infective disease, or of scrofula and phthisis, or that their health is in any other way disadvantageously affected.

III. No positive fact, authorizing the belief or suspicion that lymph from a true Jennerian vesicle may be the vehicle of syphilitic or other constitutional infection, has been reported to the Swedish General Board of Health; but the law concerning vaccination prescribes, as a due precaution in this respect, that vaccine matter must never be taken from persons who, after careful examination, are not found to be exempt from syphilis and other constitutional diseases, or from children whose parents are known or suspected to be, or have been, infected with any such disease. That a duly educated medical practitioner ever should inoculate, by mistake, some other disease instead of the proposed vaccination, is not admissible.

IV. The law in Sweden concerning vaccination prescribes, as a general rule, that children should be vaccinated before the age of two years. When small-pox is epidemic, vaccination ought to take place even in the first months of life. Re-vaccination, generally *recommended* at the age of fifteen years, is *prescribed* for recruits of the army and navy. Experience has justified all those prescripts.*

SMALL-POX DEATH RATES for the KINGDOM OF SWEDEN for the 107 Years, 1749—1855.—Calculated by Mr. HAILE from facts officially communicated.

Year.	*Small-pox Deaths per Million of living Population.	Year.	Small-pox Deaths per Million of living Population.	Year.	Small-pox Deaths per Million of living Population.	Year.	Small-pox Deaths per Million of living Population.	Year.	Small-pox Deaths per Million of living Population.	Year.	Small-pox Deaths per Million of living Population.
1749	2,543	1767	2,102	1785	2,361	1803	611	1821	14	1839	621
„50	3,494	„ 8	5,314	„ 6	311	„ 4	605	„ 2	4	„40	207
„ 1	3,106	„ 9	5,069	„ 7	823	„ 5	449	„ 3	15	„ 1	75
„ 2	5,714	„70	2,581	„ 8	2,534	„ 6	613	„ 4	226	„ 2	18
„ 3	4,395	„ 1	2,152	„ 9	3,137	„ 7	884	„ 5	449	„ 3	3
„ 4	3,735	„ 2	2,674	„90	2,734	„ 8	757	„ 6	223	„ 4	2
„ 5	2,546	„ 3	5,979	„ 1	1,421	„ 9	1,007	„ 7	212	„ 5	2
„ 6	4,226	„ 4	1,020	„ 2	878	„10	347	„ 8	90	„ 6	0⅜
„ 7	5,475	„ 5	631	„ 3	942	„ 1	291	„ 9	19	„ 7	4
„ 8	3,783	„ 6	737	„ 4	1,757	„ 2	167	„30	36	„ 8	21
„ 9	2,074	„ 7	943	„ 5	2,955	„ 3	225	„ 1	211	„ 9	99
„60	1,885	„ 8	3,178	„ 6	1,963	„ 4	126	„ 2	213	„50	395
„ 1	3,002	„ 9	7,196	„ -	751	„ 5	191	„ 3	387	„ 1	707
„ 2	4,879	„80	1,593	„ 8	585	„ 6	277	„ 4	352	„ 2	433
„ 3	6,011	„ 1	699	„ 9	1,609	„ 7	96	„ 5	147	„ 3	78
„ 4	2,335	„ 2	1,165	1800	5,126	„ 8	120	„ 6	45	„ 4	57
„ 5	2,387	„ 3	1,832	„ 1	2,563	„ 9	63	„ 7	117	„ 5	11
„ 6	2,065	„ 4	5,810	„ 2	644	„20	55	„ 8	583		

* N.B. From 1749 to 1773, the mortality from measles is included in the small-pox death-rate.

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* The above answers from the Royal Swedish General Board of Health are stated by the Board to be founded, not only on the official Reports which the Board during a period of forty years (1817-1856) has received from all the vaccinators in the kingdom, but also on opinions now given by the Medical Society of Sweden, and by several medical men especially competent in the subject. They may consequently be justly considered as the true results of Swedish experience in vaccination. The Board also transmit from the Register Office of the kingdom a summary account of the population, births, and deaths in Sweden, during the last 107 years; distinguishing those due to small-pox. This document alone gives decisive answers to the first two and most important questions considered; and the Board believe they need no comment to prove, beyond doubt, the great influence of vaccination in Sweden as an invaluable although not absolute preventive against one of the most destructive diseases that ever afflicted mankind.

POPULATION, BIRTHS, and DEATHS in SWEDEN (Finland excepted) during Half a Century before and Half a Century after the Establishment of VACCINATION, extracted from the original Reports of the Clergy to the Royal General Registry Office.

YEAR.	Population at the end of the Year.	Born alive during the Year.	Mortality during the Year.			YEAR.	Population at the end of the Year.	Born alive during the Year.	Mortality during the Year.		
			Total.	From Small-pox. *See*Note(*).	From Typhus and Typhoid Fever.				Total.	From Small-pox.	From Typhus and Typhoid Fever.
1749	—	59,483	49,516	*4,453	3,948	1803	—	74,644	56,577	1,464	6,265
1750	—	64,511	47,622	*6,180	3,581	„ 4	—	76,443	59,584	1,460	6,860
„ 51	1,785,727	69,291	46,902	*5,546	3,398	„ 5	2,427,408	76,552	56,663	1,090	6,023
„ 52	—	64,973	49,467	*10,302	2,857	„ 6	—	74,581	65,728	1,482	7,179
„ 53	—	66,007	43,905	*8,000	3,126	„ 7	—	75,842	62,318	2,129	8,065
„ 54	1,837,314	68,795	48,645	*6,862	3,505	„ 8	—	73,963	82,311	1,814	12,527
„ 55	—	70,008	51,090	*4,705	3,609	„ 9	—	64,300	93,532	2,404	21,171
„ 56	—	67,987	52,062	*7,858	4,320	1810	2,377,851	78,916	75,607	824	9,193
„ 57	1,870,372	61,675	55,829	*10,241	5,502	„ 11	—	84,862	69,246	698	7,430
„ 58	—	63,262	60,527	*7,104	5,566	„ 12	—	81,079	73,095	404	8,058
„ 59	—	63,865	49,162	*3,910	5,413	„ 13	—	72,021	66,266	547	6,261
1760	1,893,248	68,384	46,721	*3,568	5,339	„ 14	—	75,837	60,959	308	5,555
„ 61	—	67,324	49,143	*5,731	4,753	„ 15	2,465,066	85,239	57,829	472	5,325
„ 62	—	68,268	59,994	*9,389	6,022	„ 16	—	87,644	56,225	690	4,590
„ 63	1,940,011	68,231	64,180	*11,662	8,342	„ 17	—	83,821	60,863	242	5,789
„ 64	—	67,988	53,364	*4,562	7,350	„ 18	—	85,714	61,745	305	6,359
„ 65	—	65,872	54,566	*4,697	6,120	„ 19	—	84,250	69,881	161	7,210
„ 66	1,981,600	67,061	49,726	*4,092	5,445	1820	2,584,690	84,841	62,930	143	5,877
„ 67	—	70,744	51,272	*4,189	5,132	„ 21	—	92,072	66,416	37	5,853
„ 68	—	67,719	54,751	*10,650	4,054	„ 22	—	94,309	59,390	11	5,141
„ 69	2,015,127	66,954	54,991	*10,215	4,499	„ 23	2,687,457	98,259	56,067	39	4,166
1770	—	67,172	53,071	*5,215	4,555	„ 24	—	93,577	56,256	618	3,903
„ 71	—	65,988	56,827	*4,362	5,983	„ 25	2,771,252	100,315	56,465	1,243	3,962
„ 72	2,032,516	58,972	76,362	*5,435	12,846	„ 26	2,805,350	97,125	63,027	625	5,294
„ 73	—	51,164	105,139	*12,130	20,137	„ 27	2,828,568	88,138	64,920	600	7,871
„ 74	—	68,520	44,463	2,065	4,947	„ 28	2,848,062	95,354	75,860	257	9,847
„ 75	2,020,847	71,642	49,949	1,275	4,920	„ 29	2,864,831	99,488	82,719	53	9,264
„ 76	—	66,869	45,692	1,503	5,358	1830	2,888,082	94,626	69,251	104	7,353
„ 77	—	67,689	51,096	1,943	4,439	„ 31	2,901,061	88,253	75,274	612	The causes of death from disease not longer specified, *except* the Small-pox.
„ 78	—	71,901	55,018	6,607	4,337	„ 32	2,922,845	89,862	68,078	622	
„ 79	—	76,387	59,325	15,102	3,959	„ 33	2,959,257	100,309	63,947	1,145	
1780	2,118,281	75,122	45,731	3,374	3,394	„ 34	2,983,144	100,231	76,294	1,049	
„ 81	—	71,130	54,333	1,485	4,137	„ 35	3,025,439	98,144	55,738	445	
„ 82	—	68,488	58,247	2,482	5,046	„ 36	3,061,533	96,857	60,763	138	
„ 83	—	64,969	60,213	3,915	5,464	„ 37	3,080,538	94,616	75,611	361	
„ 84	—	67,605	63,795	12,453	6,494	„ 38	3,096,794	90,565	74,309	1,805	
„ 85	2,149,773	67,497	60,770	5,077	6,785	„ 39	3,115,169	91,363	72,988	1,934	
„ 86	—	70,935	55,955	671	6,989	1840	3,138,887	98,160	63,555	650	
„ 87	—	68,328	51,981	1,771	6,500	„ 41	3,173,349	95,734	61,279	237	
„ 88	—	74,019	57,320	5,462	5,858	„ 42	3,207,141	100,976	67,177	58	
„ 89	—	70,127	69,583	6,764	14,226	„ 43	3,237,180	99,154	69,115	9	
1790	2,158,232	66,710	63,589	5,893	11,408	„ 44	3,275,864	104,693	66,009	6	
„ 91	—	71,613	55,946	3,101	3,259	„ 45	3,316,536	103,660	62,074	6	
„ 92	—	81,063	52,958	1,939	4,226	„ 46	3,343,556	99,703	72,683	2	
„ 93	—	77,033	54,376	2,103	4,533	„ 47	3,363,330	99,179	79,405	13	
„ 94	—	76,429	53,377	3,964	4,476	„ 48	3,399,341	102,524	66,513	71	
„ 95	2,281,137	72,947	63,619	6,740	5,010	„ 49	3,443,803	112,804	67,842	341	
„ 96	—	79,446	56,474	4,503	3,835	1850	3,482,541	110,399	68,514	1,376	
„ 97	—	80,374	55,036	1,733	4,141	„ 51	3,516,889	111,065	72,506	2,488	
„ 98	—	78,593	53,862	1,357	4,737	„ 52	3,541,399	108,305	80,090	1,534	
„ 99	—	75,274	59,192	3,756	4,928	„ 53	3,562,462	111,407	84,047	279	
1800	2,347,303	67,555	73,928	12,032	5,872	„ 54	3,606,987	120,107	70,846	204	
„ 1	—	70,629	61,317	6,057	5,594	„ 55	3,639,332	115,072	77,734	41	
„ 2	—	74,954	56,035	1,533	5,634						

NOTE (*).—1. From 1749 to 1773 the above-mentioned mortality from small-pox (variola) embraces the mortality from measles (morbilli) also, because the notices about these two diseases have been given under the same title in the formularies; from 1774 only small pox.

2. To "typhus and typhoid fever" are referred—from 1749 to 1773, the diseases called in the formularies *febris continua, causus, febris petechialis, contagiosa*; from 1774 to 1801, *febris continua, causus, febris septica et petechialis*; from 1802 to 1811, *febres continuæ et septicæ, scarlatina, miliaria*; from 1812 to 1820, *febres cujuscumque generis*; from 1821 to 1830, *febres nervosæ, septicæ, remittentes, et intermittentes.* Of all the other diseases specified in the formularies *no one* can be referred to the denomination "typhoid fever."

3. The average ratio of mortality in Sweden has been calculated as follows:—1751–1760, *one* in 37·0; 1761–1770, *one* in 37·4; 1771–1780, *one* in 38·1; 1781–1790, *one* in 37·2; 1791–1800, *one* in 40·8; 1801–1810, *one* in 37·7; 1811–1820, *one* in 40·1; 1821–1830, *one* in 44·1; 1831–1840, *one* in 44·5; 1841–1850, *one* in 49·6.

2. NORWAY.

I. The Committee must answer this question affirmatively on the whole, but feel it their duty to remark, that, during periods of intercurrent epidemic small-pox, some few fatal cases have occurred among persons who have been vaccinated. Our experience dates from 1811, when vaccination was made obligatory in this country by law. The Committee do not, however, venture to affirm that vaccination has always been performed here in the most satisfactory manner possible, as an effective vaccination ought usually to be accompanied by fever. The intensity of the matter and the number of punctures should probably be specially considered.

II. As almost all persons in Norway are vaccinated, and as we are without data for an exact comparison with a previous time, the Committee are not able to answer the question as to typhoid fever and other infective diseases. With respect to scrofula and phthisis, there are certainly some medical men of opinion that these diseases have of late become more prevalent; but, as regards this being attributable to vaccination, we have no experience to warrant an opinion.

III. The Committee do not venture to assert, with positive facts in view, that other diseases are transmitted by vaccination, but they cannot avoid remarking that there are in Norway enlightened medical men who conceive that they have proofs of such transmission having taken place.

IV. Experience has taught us that in the great majority of cases vaccination may be performed without danger in the earliest infancy; but the experience of the Committee, as well as that of several other medical men, has also shown, on many occasions, that infants, after vaccination, do not unfrequently become sickly in various ways. As it hardly ever happens that the first case of epidemic small-pox occurs in a child, the Committee (particularly on account of the difficulty of control), in their proposal for a new law on vaccination, have not hesitated to recommend deferring it until school-time begins.

WIRTEMBERG.

I. The experience made in Wirtemberg, where vaccination has been legally enforced since the year 1818, has proved,—

That the preservative power of vaccination against small-pox is not absolute, but that in a limited portion of vaccinated individuals, after a shorter or longer period there arises again a susceptibility to the infection of small-pox;

That small-pox, however, in the great majority of cases where it befals vaccinated individuals, assumes the mitigated form of so-called varioloid, mostly running its course as a trifling disease, free from danger, and only in a small number of vaccinated persons assumes the severer form of variola vera, which in solitary instances has a fatal issue.

The following statement, abridged from official documents, relates to the only important small-pox epidemic (1848-50) that has taken place in our country since the introduction of vaccination, and illustrates in figures the influence of vaccination upon the course and mortality of small-pox:—

		Varioloid.	Var. Vera.	Died.
per 100	Not inoculated - -	*24·4 per cent.	*76·6 per cent.	39 per cent.
	Unsuccessfully inoculated	28·2 „	71·8 „	36·9 „
	Successfully inoculated	93·0 „	7·0 „	3·5 „
	Successfully vaccinated	91·0 „	8·9 „	1·7 „

* N.B. These figures must be slightly inaccurate, as their total makes 101 instead of 100. I have no means of checking the calculation.—J. S.

II. Mortality has decreased and the mean duration of life increased in Wirtemberg, as statistical evidence proves, since the introduction of vaccination. In one sense there is a greater susceptibility for other diseases, for persons who formerly died of small-pox in their infancy could not possibly die of other diseases; and thus of course a greater number must be carried off by these other diseases, which, however, have not in the least degree been increased as to their dangerousness or mortality. As regards scrofula, experience has only shown that in predisposed persons it sometimes manifests itself after vaccination, just as after other exanthemata; but at any rate, not nearly so frequently or severely as formerly was the case after small-pox. As to the fact that vaccination is thoroughly without any injurious action on health, the medical profession of Wirtemberg (in answer to questions issued a few years ago by the Government) has expressed almost unanimously the most decided of opinions; and the infinitesimal minority who affirmed an opposite opinion could not support it by scientific or practical considerations.

III. In Wirtemberg hitherto no cases have come to the knowledge of the authorities of syphilis being communicated by vaccination, but it is enjoined on the vaccinators in their instructions that they never shall vaccinate with lymph taken from a sick or ailing, or other than healthy child.

IV. In Wirtemberg the law requires that all children shall be vaccinated before completing their third year of age, except only in case of continual sickness or indisposition. By far the greater number are vaccinated within the first year: and experience is in all respects in favour of this course, first, because infants bear vaccination better than elder children, while the preservative power of vaccination has by no means proved less effective in the former than in the latter; and secondly, because the number of individuals liable to small-pox is thus as far as possible diminished.

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